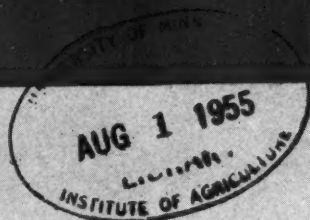


# Farm Chemicals

Pioneer Journal  
of the Industry



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IPFI Meeting .. 30

V-C 13

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Fumigant .... 52

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Vol. 118 No. 7

JULY 1955

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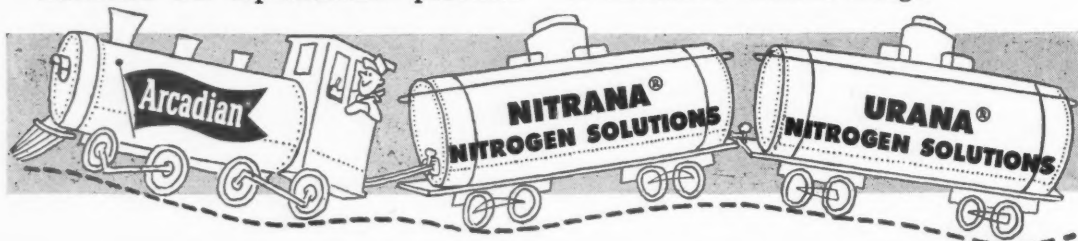


**RIGHT NOW** is the time to take the kinks out of your production plans for the new fertilizer year. **ARCADIAN®** Nitrana® and Urana® Nitrogen Solutions have many properties that make greater efficiency in a fertilizer blending and mixing plant.

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**I**N the fertilizer industry, few products have ever generated such ready and enthusiastic approval as International's new "fine-texture" Triple Superphosphate. When this new fertilizer ingredient was announced the first of the year, acceptance was immediate and widespread.

We at International appreciate your keen interest in this improved Triple Super . . . and your orders for it. They make the years of research and investment in developing this new product

even more gratifying. If you have not yet had opportunity to see this new International product, we invite you to write the Phosphate Chemicals Division for samples and quotations.

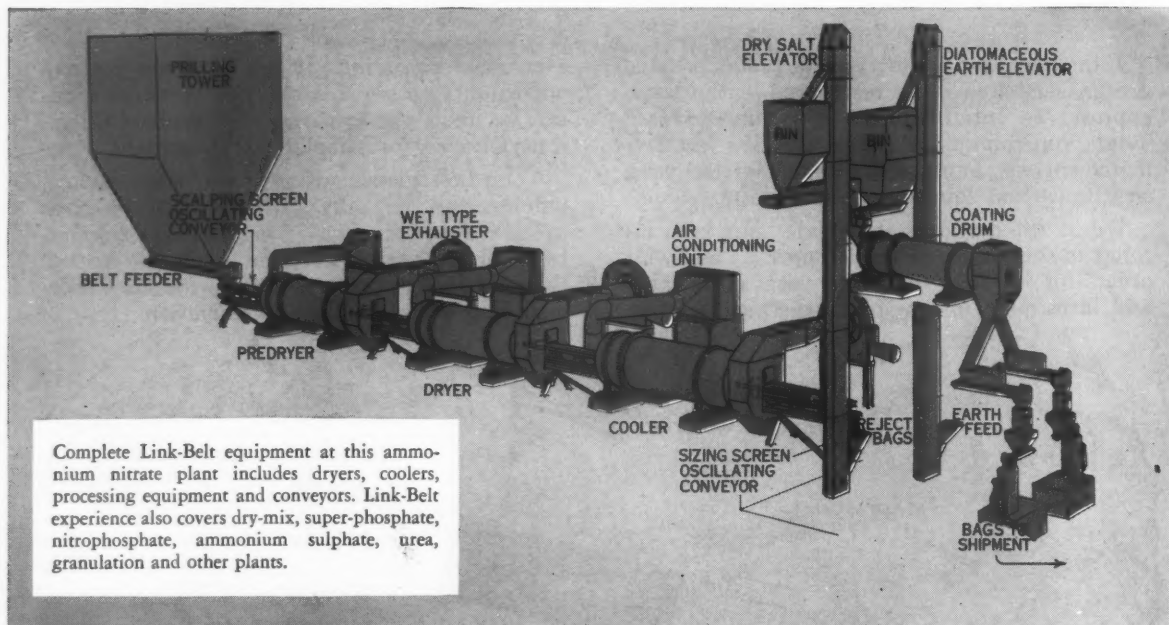
Your first glance will tell you why its fine, uniform and virtually dust-free texture gives such improved results — promotes better granulation in high analysis plant foods — reduces the need to grind before mixing — assures thorough and more complete ammoniation.



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# Why Cooperative Farm Chemicals selected LINK-BELT to completely equip its fertilizer plant



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From prilling towers to bagging machines, the commercial fertilizer plant of Cooperative Farm Chemicals Association at Lawrence, Kansas, is Link-Belt-equipped. This plant chose Link-Belt to gain the advantages of a single quality source for a broad line of materials handling, power transmission and processing machinery, which assures better fertilizer at lower cost.

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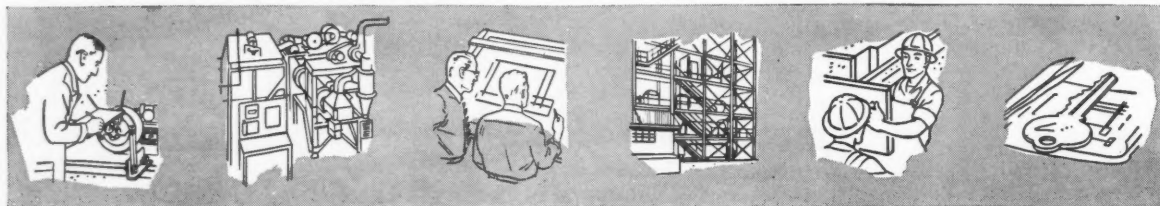
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**LINK-BELT COMPANY:** Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,681

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PILOT AND  
TESTING STATION

EXPERIENCED  
ENGINEERING

QUALITY  
EQUIPMENT

SKILLED  
ERECTION CREWS

SATISFACTORY  
PERFORMANCE

FARM CHEMICALS



## In this issue . . .

The **Big News** in this issue is not any one article—it's the completely revised **FARM CHEMICALS** format. For some time we have been working hard on a new FC face designed to fit your needs, and the mailing delay this month was caused by some of the last minute details that were thrashed out.

Our aim in making these changes is simple—to provide you, the reader, with information that will assist in the operation of your business, presenting it in a style that is easy to read and free of unnecessary wordage.

As you read through this issue, look for some of the more obvious changes—advertising is concentrated in the front and back sections to provide unbroken reading of feature articles; the type size is large and well spaced for optimum readability; news pages offer news of and concerning the industry; statistical and technical materials are de-emphasized except where they can be of direct value to you.

You can look for increasing numbers of articles on sales, purchasing, factory operation, maintenance, new products and other subjects that are directly related to your production and marketing activities. We will, of course, continue to cover the essential portions of industry trade group meetings.

If there are specific subjects that you would like to see covered, drop a line to the editor and we will do our best to provide the information that you are looking for.

## Cover story

Some 700,000 tons of fertilizer have been added by this new Joplin plant to output of Missouri Farmers Assn. Phosphate rock storage silos are shown on the left, phosphoric acid and fertilizer production units in the center and right.

JULY, 1955

# Farm Chemicals

JULY, 1955

No. 7

Vol. 118

Pioneer Journal of Farm Chemicals Industry, Est. 1894

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## STAFF

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# Business & Management

## ... News of the Industry

### Ethyl Program Bought by Pittsburgh Coke & Chem.

Arrangements have been completed by Pittsburgh Coke & Chem. co. to acquire the farm chemicals program recently terminated by Ethyl corp. Pittsburgh will continue evaluation, development and marketing of products that showed promise in the Ethyl research program.

A new fungicide, B-622, one of these compounds, has already received some publicity and will be extensively field tested this year. Also included in the program are insecticides, herbicides, defoliant and growth regulants.

### Hy-Gro, Red Arrow Lines Sold by McCormick & Co.

McCormick & co. has sold all manufacturing and product name rights covering Hy-Gro Soluble Plant Food and Red Arrow Insecticides, according to David H. Fulton, Jr., vice president, Plantabbs corp. The products will be produced and sold by a new company, Hy-Gro corp., 1101 Maryland Ave., Baltimore, Md.

Fulton, president of the new firm, stated that marketing and promotion would be combined with the current Plantabbs program. Red Arrow and Plantabbs products are distributed nationally and similar coverage is being prepared for the Hy-Gro line, now a regional material.

### CCI Adds Two Sludge Acid Regeneration Units

Two large sludge acid regeneration units have been placed in

operation by Consolidated Chemical Industries, inc., one at its Baytown, Tex., plant and another at Houston. The second, scheduled on stream in late June, makes a total of five such units operated by Consolidated.

They will primarily serve Gulf Coast oil refineries, although shipments of sludge have been made by barge from points thousands of miles distant.

### Diamond Alkali Forms Mexican Pesticide Firm

A new Mexican firm for production and distribution of pesticides, Insecticidas Diamond del Pacifico S. A. de C. V., has been formed with Diamond Alkali co. holding majority interest. Associated with the venture is a group of Mexican businessmen headed by Alfonso Robinson Bours.

Located at Ciudad Obregon, Sonora, the company is presently blending insecticide dusts for use in western Mexico. Future plans call for added plant capacity with grinding facilities for sulfur and concentrates.

President of the firm is S. S. Savage who also heads Diamond Alkali Inter-American and International corps., the parent company's export subsidiaries. Other officers include J. R. Bours, executive vice president; Alfonso Bours, secretary; A. W. Crossley, treasurer; Francisco Schwarzbeck, general manager and Oscar Gonzales, production manager.

Other pesticides, handled in Central and South America by Diamond's Inter-American subsidiary, will be distributed in Mexico by the new company.

### IMC Pays \$635,000 for TVA's Godwin Factory

TVA's Godwin phosphate plant at Columbia, Tenn., has been sold to International Minerals & Chemical corp. for \$635,000 through competitive bid. International will expand its production of phosphate rock in that area as a result of the acquisition.

International will be permitted to begin renovation earlier than the scheduled sale closing date of August 1, so that full operation will begin by the end of the year. The work will cost about \$750,000 and the plant is expected to process about 3,000 tons of ore daily.

### McGee-Uhde Sign Pact On Chemical Processes

Arthur G. McKee & co., Cleveland, has signed an agreement with The Uhde corp., New York, a subsidiary of Friedrich Uhde, G.m.b.H., Germany, to utilize many German processes in plant construction in this country, U. S. territories and Canada.

Included are a variety of processes on inorganic chemical production, some on ammonia, nitrogen products and other fertilizer materials.

A joint statement from the concerns states that Uhde will do primarily process engineering and sales development while McKee will handle design, procurement and construction of plant facilities.

### DuPont Licensed for Gallowhur Pesticide

Gallowhur Chemical corp. has announced the licensing of E. I. DuPont de Nemours & co. to manufacture solutions containing phenyl mercury acetate under U. S. Reissue Patent No. 23,863 for use in liquid seed disinfectants.

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**Lion Ammonium Nitrate Fertilizer**—For formulation or direct application. Improved spherical pellets. Guaranteed 33.5% nitrogen. Flows freely, spreads evenly.

**Lion Nitrogen Fertilizer Solutions**—For formulation. Three types to suit varying weather and manufacturing conditions.

**Lion Sulphate of Ammonia**—For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

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**LION OIL**  
CHEMICAL SALES DIVISION



**COMPANY**  
EL DORADO, ARKANSAS

## . . . Business & Management

### Develop Finance Plan For Canadian Potash

Potash resources in the Unity, Saskatchewan area of Canada will be developed through a \$17.5 million finance program completed by Western Potash corp., now Continental Potash corp. Stockholders have approved an increase in authorized capital to 15 million shares (from five) and, under terms of the program, 10 million shares have been underwritten at 65 cents per share and \$11 million will be raised by debentures.

Financing will be carried out by F. H. McGraw & co., New York, and a group of U. S. and Canadian industrial and financial companies. According to Frank Welters, president of the concern, it will have initial gross income of about \$8 million annually.

Construction of the facilities, designed for minimum initial production of 1,000 tons per day, was scheduled to begin early this month.

### MCA-DuPont Safety Prizes

Three companies, American Potash and Chemical corp., Tennessee Copper co. and Detroit Chemical Works, were presented with Lammot duPont Safety Plaque awards at the recent Manufacturing Chemists' Association annual meeting. The prize is given annually to chemical com-

panies showing the greatest improvement in safety over a five year period.

Winner among companies whose employees worked more than two million man-hours each year was American Potash & Chemical corp. The other two firms tied in the under two million man-hours class with identical percentage figures. Stauffer Chemical co. was runner-up in the over two million man-hour category.

### New Woodbury Stock Added for Expansion

H. A. Woodbury, president of Woodbury Chemical co., has announced an increase in the firm's authorized common stock to one million dollars. Rapid growth of the St. Joseph, Mo., concern and plans for expansion made the move necessary.

Two executives of the company have taken over new responsibilities—Richard W. Douglas as vice-president and Leonard R. Everett as secretary.

### Spencer Hosts to FRs At Three Day Seminar

Bank farm representatives from seven states were guests of Spencer Chemical co. at a three day program in Kansas City in which they discussed the growing responsibilities of bank farm departments.

Purpose of the event, termed an FR Seminar, was to develop information which could help banks establish or broaden a farm department. It was the first in a series for FR's chosen to participate by bank publications with the advice of state banker associations and agricultural colleges.

**Farm Representatives prepare to board chartered TWA Martin enroute to Spencer's Jayhawk Works, Pittsburg, Kan.**

### Justice Dept. Supports Sparkman Merger Bill

Principle of the Sparkman merger bill received support from the Department of Justice at a meeting of the Senate anti-monopoly subcommittee. The measure requires corporations to first notify the Government of intentions to merge, a requirement that, stated Assistant Attorney General Stanley N. Barnes, would aid in halting illegal mergers before they occur.

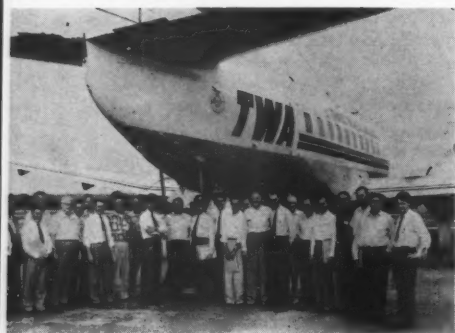
Barnes added that fewer than 30 proposed mergers were presented to the department in advance during the past two years, although corporations have been invited to discuss their plans before they are placed into effect. During the same period, the department investigated 1,600 mergers on its own.

A different approach was voiced by Carl Bunting, honorary vice-president and former president of the National Association of Manufacturers. He reported that NAM investigation proved there is no need to supervise such business decisions and that arbitrary limits on the growth of a firm would tend to suppress rather than stimulate competition.

Each company, he added, should be free to act on its own judgment in determining the size most suitable for serving its customers.

### Elemental Plant Foods Favored by Soil Scientists

A change in fertilizer labeling methods was endorsed by 95 per cent of the Soil Science Society of America in a recent mail poll. The favorable vote provides additional backing for the move to change nutrient content statements to the elemental form rather than the oxides now used.







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up by the insects.  
The important t  
control and this is being  
in practically all plant  
usually at the flowerin  
three species of insect  
cerus



Close to 3 yds. of ammonium sulphite handled by this 2¼-yd. MICHIGAN . . .

## The bonus in the bucket pays for this machine fast!

Take another look at the bucket in the photograph. It shows a typical MICHIGAN\* bucket-load, heaped-up well over the rated capacity of the bucket—nearly a 50% bonus. Translate this bonus into your daily production and you'll see why a MICHIGAN Tractor Shovel pays for itself fast: you simply move more material with a MICHIGAN.

**Tremendous digging ability.** Get the bucket blade into hard-to-dig material or under a heavy obstacle and "work" the bucket until you've got a heaping load. The two double acting bucket cylinders are actually powerful enough (if the blade is under an immovable object) to pull the back wheels off the ground! We'll match the MICHIGAN'S digging ability against any make

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**Low-level bucket action.** You can roll the bucket back only a few inches off the ground—heaping bucket-loads even when the material is scattered only a few inches high. And you can carry the full load *low*—your driver can *see* where he's going, he doesn't have to travel *backwards*.

**No clutch—faster cycles.** There's no clutch pedal on a MICHIGAN. You can actually shift between Forward and Reverse *while moving*: simply push the hand-lever on the steering column—MICHIGAN'S power-shift transmission shifts instantly. Power-shifting saves time and energy every cycle. Your operators will say: "This

sure beats riding a heavy-duty clutch all day!"

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## . . . Business & Management

### Reorganize Operations of Bennett & Clayton

Arthur A. Clayton, Fred W. Heidinger and Fred A. Clayton have sold their interest in Bennett & Clayton co., inc., Prospect Plains, N. J. and retired as members of the company. Heidinger has purchased the firm's Monmouth Junction branch and will operate as Junction Fuel & Supply co.

The Prospect Plains farm chemicals operation will continue under the old name headed by Edmund A. Rice with Bernadette E. Rice and Victor Rice as new members of the corporation.

### Davison Establishes Grace Chair of Chem.

A new professorship at The Johns Hopkins University, Baltimore, Md., the Grace Chair of Chemistry, has been established by Davison Chemical co. Dr. Paul H. Emmett of the Mellon Institute of Industrial Research, a leading catalysis authority, has accepted an invitation to fill the post.

### Settle Texas City- Chem. Const. Suit

Texas City Chemicals, inc. and Chemical Construction corp. have settled a law suit filed in April, 1954. Claims and counter claims involved contracts for design and erection of phosphate and uranium recovery facilities at Texas City, Tex.

### Simplot Plans Biggest Fert. Safety Program

A kick-off safety meeting was held for supervisory management personnel of J. R. Simplot's Fertilizer division in late May at the Bannock Hotel, Pocatello, Ida.

With W. Grant Kilbourne, vice

president and division manager, presiding, groundwork was laid for the most extensive safety program ever conducted in the division.

### Douglas Chemical Holds Sales Meet



Douglas Chemical co., North Kansas City, Mo., recently held a national sales meeting to announce its Tetrakote grain protectant. Pictured are Douglas executives and sales personnel at conclusion of the program.

### Fire at Edenton N. C. Plant

According to recent reports, a warehouse of Home Feed & Fertilizer co., Edenton, N. C., was destroyed by fire on May 23.

### Geigy to Move NYC Main Offices & Labs

Main offices and laboratories of Geigy Chemical corp. will be transferred at some future date to a 35 acre tract in Greensburgh, N. Y. near White Plains.

Four new structures are to be completed next year at a cost of three million dollars. No manufacturing facilities are included.

### Olin-Mathieson Seeks Leading Former 4-H'ers

Former 4-H Club members, deserving of public recognition for their achievements and community service, are being sought in 46 states by Olin Mathieson Chemical corp. Those excelling in leadership and citizenship will be honored under the National 4-H Alumni Recognition program.

### New Companies

**Brandt & Gardner Fert., inc.** Filed charter at Dover, Del., with Prentice-Hall Corporation System, inc., Dover, principal office. Authorized capital stock: 500 shares, no par value.

**Farm Chemical Resources Development corp.** Filed charter at Dover, Del. with U. S. Corporation co., Dover, as principal office. Authorized capital stock: \$2 million.

**Life-Nite Sales co.,** fertilizers. Granted charter at New Iberia, La. Capital stock: \$125,000.

**Valley Chemical co., inc.** Fertilizer producer granted charter at Greenville, Miss. Capital stock: \$200,000.

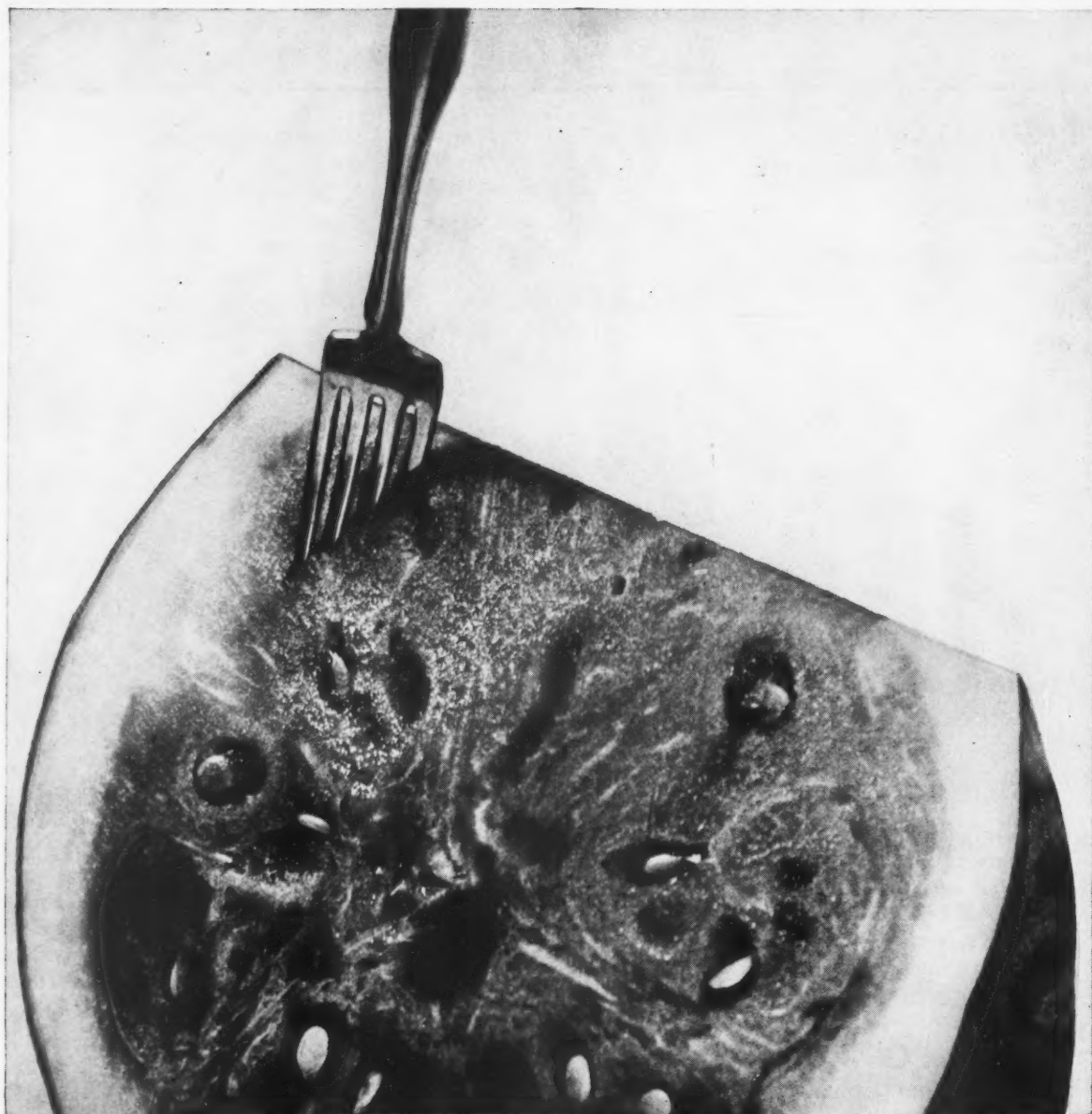
**Wonder-Gro Fertilizer co., inc.,** fertilizer, etc. Granted charter at San Antonio, Tex., with Wm. Rhame, G. J. Condos and L. R. Eastman, incorporators.

### New Address

Wilbur-Ellis co., Seattle, Wash., from the Central Bldg. to 2900 11th Ave., S. W., Zone 4.

### DuPont Opens Nitrogen Sales Office in Phila.

A Philadelphia district sales office has been established by DuPont's Nitrogen Products Sales section, to cover the Atlantic seaboard. Dr. M. F. Gribbins, former Chicago district manager, has been appointed head of the new office. Four field representatives have been assigned.



## NICE SLICE

... and the farmers who are raising watermelons these days are receiving a nice slice of the farm income, too. The use of modern commercial fertilizers has helped to increase that income.

Potash, a major component of modern commercial fertilizers, enriches the soil, improves crop quality, builds resistance to disease, and increases total product yield. USP's high-grade muriate of potash is free-flowing and non-caking—important advantages in the production of fertilizers that help raise the crops and the income of the American farmer.



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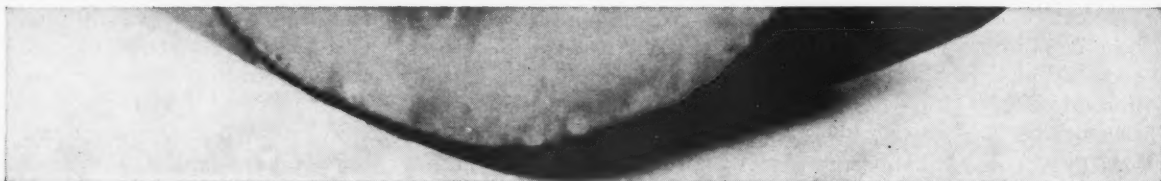
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## CONSTRUCTION

### Campbell Plans Iowa Liquid Fertilizer Plant

Plans to install a liquid fertilizer manufacturing plant at Strawberry Point, Iowa, have been announced by the Farm Products div. of H. D. Campbell co.

William Cannon, manager of Campbell's Farm Hatcheries, also will be in charge of the fertilizer formulation setup. Part of the buildings of the hatchery unit will be utilized for production of Gro-Green concentrates, and new buildings and storage facilities will be added as needed, the company reports.

A complete line of weed killers, insecticides and other farm chemicals will also be warehoused at Strawberry point for distribution in the area.

Several other processing locations are under consideration for similar plant installations in other states, and the company has a franchise plan for production units in some areas.

The Strawberry Point unit is expected to be ready for fall operation, but orders are being accepted and delivered from the main office and plant location at Rochelle, Ill. Storage facilities will be installed for bulk materials and barrel and small package goods to be warehoused for distribution to dealers in eastern Iowa and nearby areas.

### Tennessee Corp. Adds Plant in Mississippi

A new fertilizer plant will be constructed by Tennessee corp. at New Albany, Miss. Work was expected to begin sometime during June, and the plant will be ready for operation in the fall.

Costs are estimated at about

\$150,000, and the factory is expected to employ about 40 persons. The site is located on the Gulf, Mobile and Ohio Railroad.

### Permit Issued for NH<sub>3</sub> Plant in Merced Co., Cal.

The Merced County (California) Planning Commission has issued a permit to the Ammonia Chemical Corp. of Calif., San Francisco, to construct a \$3.25 million anhydrous ammonia plant in the Red Top district. Nearby gas wells will supply raw materials.

It is reported that the company plans to construct housing facilities for 30 employee families with a community center and other facilities.

### Korea Fert. Contract to McGraw-Hydrocarbon

A contract for the design and construction of a \$25 million chemical fertilizer plant in Korea has been awarded to McGraw-Hydrocarbon, inc. To be financed by the Foreign Operations Administration, the plant will produce 85,000 tons a year, nearly one-third of Korea's present agricultural needs.

Clifford S. Strike, McGraw president, reports that an engineering team is now selecting the site which will probably be in the Chung Ju area about 80 miles southeast of Seoul on the Han river.

It is estimated that 30 months will be required for completion of the project. Administrative and supervisory personnel will probably be recruited in this country.

The contractor is a joint venture of F. H. McGraw & co. and Hydrocarbon Research, inc.

### Escambia Bay Factory Now Under Construction

Work is underway on the petrochemical plant to be operated by Escambia Bay Chemical corp. between Milton and Pensacola in Santa Rosa county, Fla. Using natural gas as the principal raw material, the plant will produce as much as 250 tons of anhydrous ammonia per day, from which a daily output of some 220 tons of nitric acid, 275 to 350 tons of ammonium nitrate and 200 tons



Escambia Bay Pres. M. A. Abernathy (center) breaks ground with E. L. Stokes, chief accountant, and A. J. Bruno, chief engineer.

of ammonium nitrate-ammonia fertilizer solutions may be developed.

Completion of construction work by Chemical Construction corp. is scheduled for January, 1956. Ashcraft-Wilkinson co. has been designated sales agent for fertilizer products of Escambia Bay.

### New O. M. Scott Plant

Construction of a \$1 million plant at Marysville, O., for production of Scott's Turf Builder is reported planned by O. M. Scott & Sons co.

## Nitrogen News

### Plans Completed for Great Plains AAA Show

Plans for the Great Plains Agricultural Ammonia Association Midwest Trade Show and Field Day, July 20-21, have been completed, according to James H. Andrew, secretary-treasurer of the group.

The trade show and a business session will be held on the 20th at Hotel Ft. Des Moines, Des Moines, Iowa, and, on July 21, an anhydrous ammonia test plot demonstration will take place at a location seven miles south of Ames, Iowa.

### Radco Group Merges With Chem. Enterprises

Chemical Enterprises, inc., has again increased its holdings in the ammonia distribution field, this time through merger of Radco fertilizer companies of southwestern Iowa with the New York concern. According to Daniel B. Curll, Jr., president of CE and Carl Reid, Don Allison and Homer Dudley of Radco, the new acquisitions include Radco Fertilizer co., inc., Radco-Eastern div. and

Radco-Creston div., with a chain of 10 ammonia stations in the corn growing area along the Iowa-Missouri border.

Although the former Radco management remains unchanged, two new members have been elected to its board, Curll and Tully W. Talbot, president of Chemco, another Iowa CE subsidiary.

The move strengthens CE's position in western Iowa and activity of Radco in solid fertilizers adds further diversity to its line in that area.

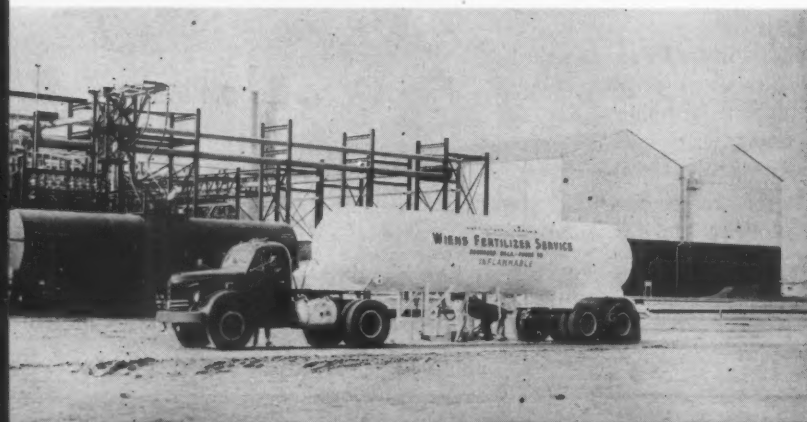
### Ship First Urea from Grace Memphis Plant

First commercial shipment of urea from Grace Chemical's Memphis, Tenn., nitrogen plant was accepted by Perkins Glue co. during brief ceremonies held early last month.

Wm. J. Haude, Grace vice president and general manager, reported that ammonia production now exceeds designed capacity of 250 tons a day, and urea output is soon expected to reach rated capacity of 150 tons a day.

Urea will be sold nationally and exported by Grace in crystalline and two prilled forms.

The largest tank truck shipment to date from Nitrogen div.'s Omaha plant is loaded for delivery to Wiens Fertilizer Service, Drummond, Okla. The anhydrous ammonia shipment came to more than 5,028 gallons, over half the 10,000 gallon capacity of the division's most commonly used tank cars.



## OVERSEAS

**Australia.** Cresco Fertilizers, Ltd., has announced plans to enlarge acid and superphosphate plants at Port Lincoln, S. Aust.

A phosphate and mixed fertilizer plant in Southland may be erected within the next 18 months by Southland Fert. co., Ltd., a firm organized by Kempthorne Prosser & co.'s New Zealand Drug co., Ltd., and Dominion Fert. co., Ltd. Application has been made for approval of the formation of the new company.

**Chile.** A fertilizer plant is being erected at Pencon (near Concepcion) with technical assistance from Compagnie Nord Africaine de L'Hyperphosphate Reno. Raw materials will be imported from French North Africa, and yearly output is expected to reach 45,000 tons.

Production of nitrates in 1954 slightly exceeded 1953 output reaching a total of 1,580,898 metric tons. About two-thirds was produced by the Guggenheim method. The USA was Chile's largest single nitrate customer, followed by France and Spain.

**England.** Imperial Chemical Industries' Board of directors has expressed opposition to any chemical industry nationalization, stating that it would harm domestic and overseas work.

**Italy.** Fertilizer consumption is reported to have steadily increased for the past three to four years, and production capacity may continue to grow. One or two small plants were expected to begin operation this year. Capacity now exceeds demand so that small amounts of nitrogen and phosphate are exported. In 1953-54, NPK consumption reached 575,027 metric tons.

# PHILLIPS OFFERS



## FERTILIZER MATERIALS FOR HIGH ANALYSIS MIXTURES

### 1 AMMONIUM SULFATE



New Premium Quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry-cured* to remove excess moisture—prevent caking. Uniform, dust-free crystals flow freely—mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

### 2 ANHYDROUS AMMONIA



Phillips 66 Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

### 3 NITROGEN SOLUTIONS



Get more N per dollar! There are three Phillips 66 Nitrogen Solutions for use in preparation of

high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low, help rapid, thorough curing.

### 4 AMMONIUM NITRATE



Phillips 66 Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for uniform, free-flowing properties in formulations and top-notch crop response as a direct application material.

### 5 TRIPLE SUPERPHOSPHATE



Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high analysis fertilizers.

## PHILLIPS CHEMICAL COMPANY

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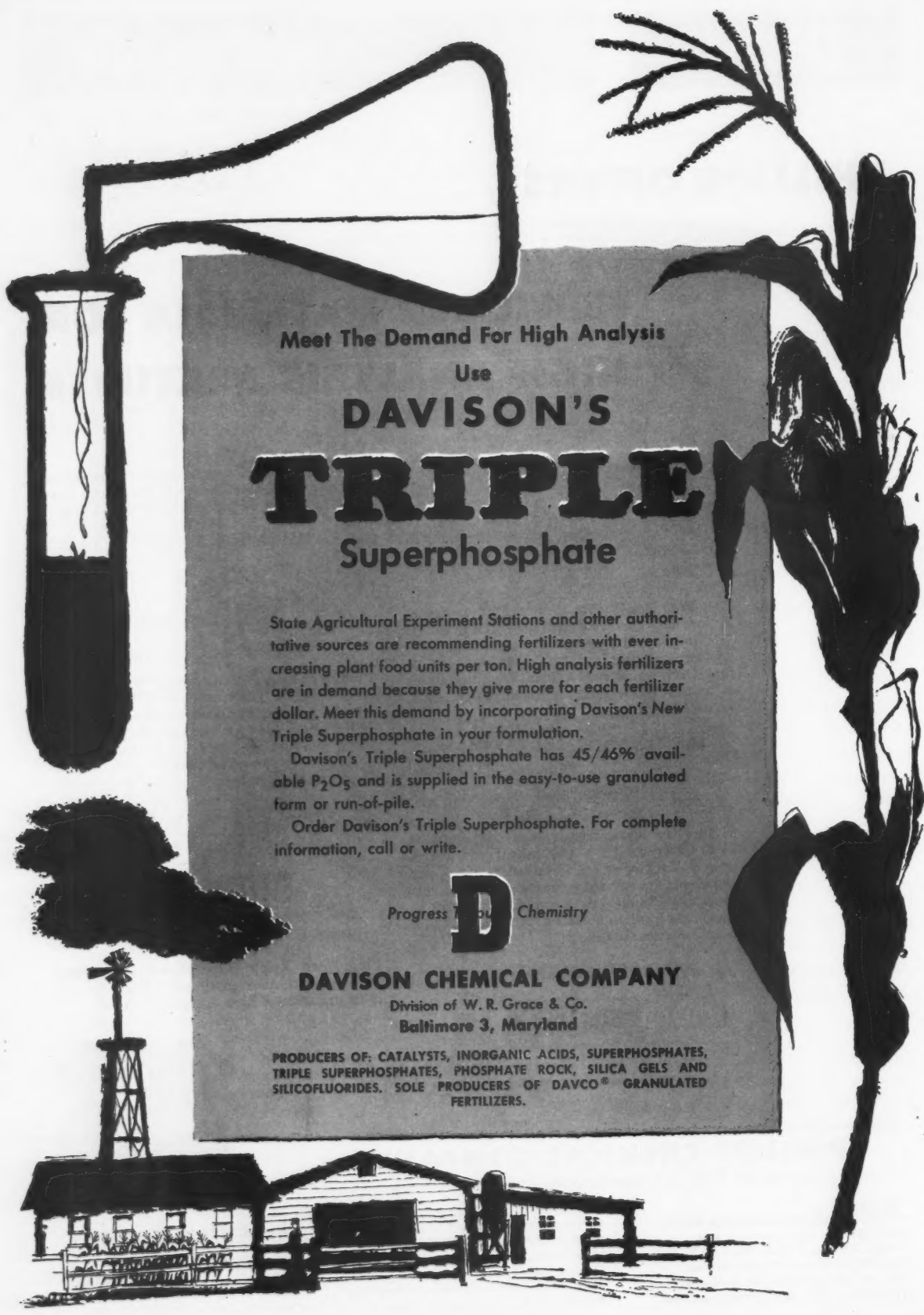
#### Offices in:

AMARILLO, TEX.—First Nat'l Bank Bldg.  
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CHICAGO, ILL.—7 South Dearborn St.  
DENVER, COLO.—1375 Kearney Ave.  
DES MOINES, IOWA—606 Hubbell Bldg.  
HOUSTON, TEX.—1020 E. Holcombe Blvd.

INDIANAPOLIS, IND.—1112 N. Pennsylvania St.  
KANSAS CITY, MO.—500 West 39th St.  
MINNEAPOLIS, MINN.—212 Sixth St. South  
NEW YORK, N. Y.—80 Broadway  
OMAHA, NEB.—WOW Building  
PASADENA, CALIF.—604 Citizens Bank Bldg.  
RALEIGH, N. C.—804 St. Mary's Ave.

SALT LAKE CITY, UTAH—68 South Main  
SPOKANE, WASH.—521 E. Sprague Ave.  
ST. LOUIS, MO.—4251 Lindell Blvd.  
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TULSA, OKLA.—1708 Utica Square  
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State Agricultural Experiment Stations and other authoritative sources are recommending fertilizers with ever increasing plant food units per ton. High analysis fertilizers are in demand because they give more for each fertilizer dollar. Meet this demand by incorporating Davison's New Triple Superphosphate in your formulation.

Davison's Triple Superphosphate has 45/46% available  $P_2O_5$  and is supplied in the easy-to-use granulated form or run-of-pile.

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## PEOPLE

Dr. K. Starr Chester has resigned as consultant at Battelle Institute to become technical advisor to the managing vice president of **Alton Box Board company**, Alton, Ill.

**American Agricultural Chemical company** has named D. S. Parham general superintendent, in charge of fertilizer production. Associated with AAC since 1947, Parham was formerly general superintendent of maintenance.

**Died:** Hal Pond Eastman, 70, retired vice president and director of **American Cyanamid company**, on May 4 in Pasadena, Calif; and Howard R. Huston, 62, retired vice president and director of American Cyanamid, on June 8 in Truro, Mass.

W. E. Shelburne, executive vice president for the past five years, was elected president of **Armour Fertilizer Works, Inc.**, at a recent meeting of the board of directors of the parent Armour &



Sanford



Shelburne

company. Also elected vice president of Armour & company, he will succeed John E. Sanford, president for 23 years, who recently announced his retirement, effective June 3. Shelburne joined Armour Fertilizer 25 years ago as a salesman in the Montgomery, Ala., division.

JULY, 1955

Resignation of F. A. Faulkinberry as plant manager and G. E. Tomlinson as production superintendent has been announced by **Associated Cooperatives**. W. W. Edwards is acting plant superintendent.

Appointment of William Lee Guithues as sales representative for the St. Louis office has been announced by **Bradley & Baker**. Formerly associated with Merchants' Exchange in St. Louis as assistant to the secretary and as a research chemist with Darling & company, Guithues will cover the West North Central territory.



Guithues

**California Spray-Chemical corporation** has named Richard H. Trumble branch manager of its Wenatchee, Wash., offices, replacing Harold J. Matson, who has been promoted to district manager for the Pacific northwest area.

Three new scientists for **California Spray-Chemical corporation's** Research department: Dr. Edward W. Melvin, plant physiologist-pathologist; Dr. Walter D. Thomas, lead research pathologist and Dr. Benjamin Makower, chemist. All will locate in Richmond, Calif.

**Carbide & Carbon Chemicals company** has named M. W. Duncan and J. R. Better assistant district sales managers at Kansas City, Mo., and Detroit, Mich., respectively.

George S. Cripps has been named manager of agricultural development in the Chemical division of **Climax Molybdenum company**.

Foster G. Garrison has been named director of market re-

search by **Columbia-Southern Chemical corporation**. Three other appointments have been made in the company's Market Research and Development department. Chester J. Stroemple, named director of market development; Eugene D. Witman, assistant to the director of market development and Louis B. Taylor, manager of pulp and paper development.

Dr. Edward L. Chandler has joined the technical staff of **Diamond Alkali company's** Chlorinated Products division. To be concerned chiefly with development of new farm chemicals as well as technical service on Diamond's present line of pesticides, he will locate at the company's Research Center at Painesville, Ohio.

Charles W. Shepherd is new production manager of **Federal Chemical company's** Columbus, O., plant. An engineering graduate of Vanderbilt University, Shepherd has been with Federal Chemical three years.

Kenneth K. Krausche is appointed research engineer assigned to sales by **Floridin company**. Prior to his appointment, he was engaged in technical supervising and sales capacities for Pennsylvania Salt Manufacturing company.

He will headquarter at Floridin's offices and laboratories in Tallahassee, Fla.



Gale

John F. Gale has been named manager of market research of **Garden Foundation, inc.**, effective June 20. Since 1950, Gale has served as economist and editor for the National Fertilizer Association and has been (to page 20)

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Cable Address "SCHMUTZ"—Long Distance Phone CLAY 7771

## ... People

(from page 17) author of many articles on the economics of the fertilizer industry.

He will be located at 1901 St. Paul St., Baltimore, Md.

Ray L. King, of **Georgia Fertilizer company**, has retired from the Agricultural Committee of the Chamber of Commerce of the U. S. after having served nine years, NFA FERTILIZER NEWS recently reported. The fertilizer industry will continue to be represented on the committee by W. B. Hicks, Wilson and Toomer Fertilizer company president.



Parks

**Grace Chemical company's** manager of agricultural services, Robert Q. Parks, has been named general sales manager.

Prior to joining the firm, he was head of soil management and irrigation agriculture for USDA in Beltsville.

Dr. M. K. Miller, formerly chief agronomist of Tennessee corporation, has been named president of **Green Belt Chemical company**. Construction of a modern mixing plant for Green Belt is scheduled to begin in the near future.

**Died:** George H. Kaelin, 51, vice president of **Long Island Produce & Fertilizer company**, on June 2 in Southold, Long Island.

**Died:** Charles Luther Ives, former president of **New Bern Cotton Oil and Fertilizer Mills**, on April 6.

Frank J. Smith, who has been manager of American Oil company's Petrochemical division, has been elected vice president and general sales manager, a director and member of the Executive committee of the newly formed subsidiary, **Pan American Chemicals corporation**. The new firm will market petrochemicals manufactured at American Oil's Texas City plant.

Smith will continue to make his headquarters in New York.

Vice president in charge of **S. B. Penick & company's** Insecticide division, Harold Noble, has retired after 38 years with the firm. Frank Seeland, who has been in active management of the division for some time, now assumes full charge.



Adams

Stanford Adams has been named sales representative to the Dallas office of **Pittsburgh Coke & Chemical company's** Agricultural Chemicals division. He will serve in the Eastern Texas, Arkansas, Louisiana and Eastern Oklahoma territory.

Prior to his recent appointment, he was general manager of Hall's Aero Spraying co. in Clarksville, Ark.

**Shell Chemical corporation** Marketing department changes: W. C. Lowrey, St. Louis, Mo., district manager, has been named manager of the Newark, N.J., district. He is succeeded in St. Louis by W. A. McCormick. R. W. Campbell is new Los Angeles district manager, replacing J. E. Toevs, new sales manager, Syn-



Smith

thetic Rubber Sales div. G. E. Garland, New York district manager, has been named to the sales manager's staff, and D. P. Jones, of the sales manager's staff, has been named district manager in New York.

**Standard Oil company** (Ohio) has appointed Edward W. Sann, Jr., manager of market and product development, Petrochemical department. Sann had been with Atlas Powder company.



Keena

J. L. Keena has been named sales representative in the Midwest area of **Stauffer Chemical company's** Agricultural Chemical division. He will locate in the company's Chicago, Ill., office.

Newly appointed assistant manager of sales development for **Stauffer Chemical company** is Philip McLaughlin.

L. C. Oakley, Jr., is newly appointed general manager of **Tennessee corporation's** U. S. Phosphoric Products division.

**Died:** James W. Schofield, manager of **Tobacco By-Products & Chemical corporation's** Richmond, Va., plant.

**Virginia-Carolina Chemical corporation** has promoted Glenn O. Middleton to manager of its Dubuque sales office. A V-C employee since 1937, he most recently held the position of assistant manager at Dubuque.

He is succeeded in this post by C. Aubrey Clayton, a former salesman at Memphis.



Middleton





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## GOVERNMENT

### FTC Case-Handling Rules Now Modernized

Federal Trade Commission rules for case handling have been completely modernized to minimize delay and promote better operation. According to Edward F. Howrey, FTC chairman, the commission followed, wherever possible, recommendations made by the President's conference on administrative procedure.

For a copy of the new rules of practice and procedure write the Division of Legal and Public Records, Federal Trade Commission, Washington 25, D. C.

### Potash Permit, Lease Rules Revised by USDI

Department of the Interior regulations covering permits and leases of potash areas have been revised to encourage marginal production in fringe areas adjoining base leaseholds.

Operators now have two options in paying for the right to mine fringe areas—a cash bonus payment of \$15 per acre for the right or a royalty on fringe area production equal to the amount of royalty specified in the base lease plus an added one cent per ton of ore mined.

The new rules also permit dating of preference right leases on the first of the month following approval of leased applications and provide for positive notification of lessees in advance of lease adjustments.

### Byron Shaw, 8 Others Receive USDA Awards

On June 1, Secretary Benson presented Distinguished Service

Awards to nine USDA employees, including William A. Dayton, Forest Service, for research on grasses, trees and range vegetation; Lester A. Schlup, Extension Service, for professional leadership in developing communications methods in extension work and Dr. Byron T. Shaw, Agricultural Research Administrator, for research leadership.

### FOA Authorizations

**Bolivia.** Ammonium phosphate fertilizers, \$50,000. (PA No. 11-235-00-79-5004). Source—USA & poss. Ending delivery date—7/31/55. Procurement through Emergency Procurement Service, GSA.

**China (Formosa).** Machinery & equipt. for urea plant of Taiwan Fert. co., \$2,878,000. (PIO/C No. 84-23-046-9-50251). Contract period—6/1/55-12/31/55. Source—World wide. Ending delivery date—12/31/56. Procurement by Hydro-Carbon Research, inc., New York City, representing Taiwan Fert. co.

**India.** Agr. pesticides for national filaria control program, \$178,000. (PIO-C No. 86-51-054-5-50072). Source—World wide. Ending delivery date—12/31/55. Procurement through EPS, GSA.

**Pakistan.** Agr. pesticides, \$93,914. (PIO/C No. 91-13-022-9-50319). Contract period—5/1/55-10/31/55. Source—World wide. Ending delivery date—1/31/56. Procurement through Ministry of Industries, Dept. of Supply & Development.

**Vietnam.** Agr. pesticides for Malaria Control Service, \$142,000. (PIO/C No. 30-51-029-7-50061.1). Source—USA & poss. Procurement through EPS, GSA.

### TVA Fert. Production Hit in Hoover Report

TVA fertilizer production in competition with private industry was hit by the Hoover commission in a recent report. It recommended that TVA discontinue all chemical research and that its fertilizer research facilities be transferred to USDA.

Also recommended to the Congress was determination of true TVA fertilizer production costs and that the price of agency plant foods include all costs, direct and indirect "including the loss of taxes" which could be obtained from private industry.

Commenting on the report, Dr. Harry A. Curtis, a TVA director, said that it "doesn't make sense." He added that the commission recommendations would "render almost meaningless the whole fertilizer program."

Curtis pointed out that TVA has urged industry to utilize agency processes and to supply demand as it develops. TVA Chairman Herbert D. Vogel commented that he is willing to see the facilities turned over to USDA whenever the department shows it can handle the program as capably and economically as TVA.

### Hoblitzelle NAAS Awarded to Olsen

The Hoblitzelle National Award in Agricultural Sciences has been won by Dr. Sterling R. Olsen, USDA soil scientist stationed at Fort Collins, Colo., for development of a new, reliable method for estimating the amount of soil phosphorus available to plants.

### Elting to New ARS Post

Following the retirement of Dr. Robert W. Trullinger as assistant administrator for experiment stations, Agricultural Research Service, USDA, Dr. E. C. Elting, deputy to Dr. Trullinger, was designated acting assistant administrator.

FARM CHEMICALS



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Careful testing of your phosphate at every stage of production—washing, blending, drying, grinding and loading—is one of the factors in *International's* quality control that assures uniformity of grade to exact specifications. Your phosphate is sampled and tested in our analytical laboratory at least five times before shipment. Blending grades to your special requirements is simple routine because of our large tonnage and the flexibility of our modern production facilities. When you depend on *International* for phosphates, our great team of mining, production and service people sees to it that you get exactly what you order, in the tonnage you need, when you want it. That's what quality control means.

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**PENCO ENDOTHAL\* HARVEST AID**

(Formerly called Penco Endothal Desiccant)

Excellent for drying legume seed crops and seed corn in the field.

Eliminates windrowing, field drying, reduces seed loss.

Permits earlier, controlled harvesting of more acres per day.

Allows direct combining of crops.

Is clean—won't stain hands or clothing; easy to apply.

(Write for Bulletin A-1)

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A magnesium chlorate type defoliant . . . dissolves quickly in water . . .

saves time . . . not acutely toxic or unpleasant to handle.

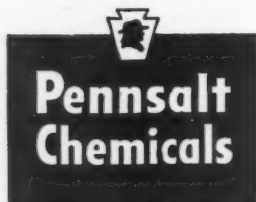
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(Write for De-Fol-Ate Bulletin)

**PENCO ENDOTHAL NURSERY DEFOLIANT**

A liquid spray adapted for use in defoliating certain nursery stock.

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**Pennsylvania Salt Manufacturing Company of Washington**

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Portland, Ore. • Wenatchee, Yakima, Wash.

Los Angeles, Berkeley, Calif.

\*Endothal is the accepted generic name for 3,6-endoxohexahydrophthalic acid. The manufacture and use of endothal products are covered by one or more of the following U.S. Patents: 2,550,494; 2,576,080; 2,576,081; 2,576,083; others pending.



## Associations & Meetings

### MWSIC Distributing Corn Growing Folders

A new four-color folder entitled "You Can Grow Profitable Corn This Year" is now being distributed by the Middle West Soil Improvement Committee for sales promotion and educational use.

Through pictures, graphs and charts, the eight-page folder points up the role of high yields in cutting cost of production per acre, amount of plant nutrients needed, rate at which nutrients must be made available during summer and methods of application.

In addition, the folder visualizes some of the common hunger signs and stresses the need for efficient control of weeds, insects and diseases.

### NFA Wall Poster Wins Prize in Litho Contest

First prize was won recently by NFA's wall poster, "How to Take a Soil Sample," in the poster class of the Fifth National Offset-Lithographic Awards Competition and Exhibit.

John F. Gale handled production for NFA; John Craddock, a Washington artist, prepared the art work, and printing was by Colortone Press.

The association reports it has distributed about 25,000 copies of the poster.

### 600 Executives to Attend AMA Summer Schools

About 600 business executives will go to summer school this year under the auspices of the American Management Association, that group reports. On July 6 at Hamilton, N. Y., AMA will inaugurate its first summer pro-

gram of educational meetings for management on the Colgate University campus.

Details of the summer program may be obtained by writing Registrar, School of Management, American Management Association, 300 W. 43rd St., New York City 36.

### CIA Elects Officers

Newly elected vice presidents of the Controllers Institute of America are William A. Crichley, controller of Diamond Alkali co., and Irving D. Dawes, vice president and treasurer, Virginia-Carolina Chemical co.

### Hoover New MCA Chmn., Wm. C. Foster Resigns

J. R. Hoover, president of B. F. Goodrich Chemical co., was elected chairman of the Manufacturing Chemists' Association's board of directors at the group's 83rd annual meeting in White Sulphur Springs, W. Va. He succeeds Fred J. Emmerich, president of Allied Chemical & Dye corp., who continues as an association director.

Reelected by MCA members were William C. Foster, president, Howard S. Bunn of Union Carbide and Carbon corp., vice president and M. F. Crass, Jr., full-time secretary-treasurer. President Foster announced his resignation as president and director, stating that he will continue with the association until a successor has been found.

William H. Ward, vice president of DuPont co., was elected chairman of the Executive committee, and J. Albert Woods, Commercial Solvents corp. president, was named as MCA vice president.

### Lange Elected Head of Mo. Plant Food Council

A tour of the University of Missouri's South Farm and election of officers were held during the annual meeting of the Soil Fertility and Plant Nutrition Council of Missouri at the University on June 2.

At the annual business meeting, Henry K. Lange of Lange Brothers was elected president; Perry Onstot, Davison Chemical co., vice president and George LaRock, Olin Mathieson Chemical corp., secretary-treasurer.

Dr. George Smith, O. T. Coleman and John Falloon of the Soils dept. of the College of Agriculture conducted the tour and discussed results secured from the research and demonstration program. Dr. W. A. Albrecht discussed results obtained on Sanborn Field.

The council is a non-profit organization organized last year to promote, encourage and assist in a program of increasing soil productivity and better farming practices pertaining to soil fertility and plant nutrition.

### Pennsalt's Ott Named President of CMRA

At the Chemical Market Research Association's recent meeting, E. M. Ott of Pennsylvania Salt Mfg. co., was named president-elect, succeeding C. P. Neidig of White, Weld & co., who becomes the association's new president.

Also elected were Parker Friselle of Dow Chemical co. and F. S. Godron of Victor Chemical Works as councillors-at-large.

### Del-Mar-Va Group Meets

On July 25, a meeting of the Del-Mar-Va Peninsula Fertilizer Association was held in George Washington hotel, Ocean City, Md.



Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

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**for over 85 years a symbol of quality and reliability**

### **principal AA QUALITY products**

**All grades of Florida Pebble Phosphate Rock**

**AA QUALITY Ground Phosphate Rock**

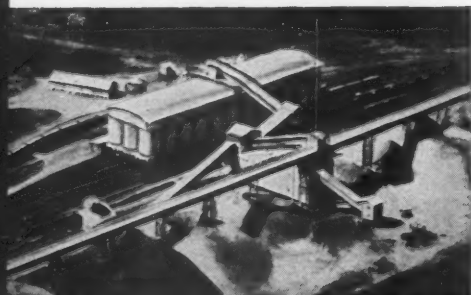
**All grades of Complete Fertilizers      Superphosphate**

**Gelatin      Bone Products      Salt Cake      Ammonium Carbonate**

**Sulphuric Acid      Fluosilicates      Insecticides and Fungicides**

**Phosphoric Acid and Phosphates**

**Phosphorus and Compounds of Phosphorus**



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

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30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

## **Farm Chemicals**

# **Washington Report**

**By John Harms**

**The Tennessee Valley Authority may or may not limit sharply the output of diammonium phosphate.** The decision to curtail its production apparently is entirely up to the TVA.

The House Appropriations committee has put out a report urging that TVA limit its output to 5,000 tons annually, instead of about 20,000 tons planned. That is an expression of the intent of Congress on the matter. Ordinarily such expressions of intent are followed by the Federal agency involved, but it is not a strict matter of course. Observers in Washington believe that TVA will acquiesce, since the committee holds the purse-strings, but there still is no assurance that it will.

The report does not involve an appropriation, so doesn't make it a pressing matter to TVA, although it conceivably could affect subsequent appropriations. Congress is not expected to pass a law requiring a curtailment of TVA production of diammonium phosphate.

The TVA report was precipitated by R. E. Bennett, president of Farm Fertilizers, inc., of Omaha and the Bennett Chemical co. of Denver.

Bennett told the House subcommittee on TVA appropriations that TVA plans to sell diammonium phosphate at \$20 to \$25 per ton below prices of the commercially-produced product. He warned that "the TVA was establishing a very serious precedent in the fertilizer industry and was hurting the industry. . . ."

Diammonium phosphate, Bennett says, is produced by Bennett Chemical, as well as another company in Michigan, one in Illinois and two each in Colorado and California.

**The Government now is re-evaluating earlier studies of U. S. farm production needs by the year 1975.** Most significant conclusion reached is summed up in this statement:

"We cannot afford to be too complacent regarding our ability to increase output to the extent needed on the basis of present technological know-how and the moderate increases in cropland area that seems likely."

To the extent we can increase crop production per acre, the study indicates, we have little to worry about. But, the Government experts say, that's no small job in itself.

Of further significance to the farm chemicals industry is the observation that "We need more research and planning to raise research ceilings on crop yields so that efficient use can be made of all our cropland and pasture. Considerable research effort will be needed just to maintain high-level yields. Greater effort also needs to be directed to research and planning that will assist orderly adjustments in acreage and production."

Federal forecasters, in an attempt to pin-point the needs 20 years hence, believe we will need farm output a third greater than in 1951-53. This would call for an average annual rate of increase of 1.3 per cent compared with the long-time rate of 1.5 per cent from World War I to the present. Actually, the rate needed, they feel, is the same as has prevailed since World War II.

Total crop production in 1975 would have to be about one fourth larger than in 1951-53. The greatest increases needed in crop production would be in the feed crops—corn, other feed grains, hay, pasture and soybeans (the chief source of protein feed). Crops for which little or no increase in production would be needed include the major food grains—wheat, rice and rye. Potatoes and cotton are examples of crops whose production would need to be increased, less percentagewise than the projected increase in population—which is expected to go up a third, to about 210 million.

"Achievement of the level of yields estimated as attainable from present



technology would not be easy. Yields of corn, for example, would have to increase at about the same rate as in the last two decades when full advantage was taken of hybrid corn seed. Past rates of increase would have to be accelerated to get attainable yields estimated for pasture."

**Congress this year has voted a money increase for the Food & Drug Administration** for the year which began July 1. This reverses a three-year downtrend in FDA appropriations. FDA gets almost \$5½ million—\$348,000 more than last year. These are the final figures, requested by the Administration, and now approved by both House and Senate.

**But the increase** won't permit more spending on economic violations of food and drug laws (as some food industries would prefer). Officials indicate that FDA will use most of the extra money to firm up its usual type of enforcement efforts; to carry out some survey checks; and to make more checkups on violations involving composition of food package contents.

**More money and manpower** is expected to be recommended by the Citizens committee of 14 which was established to study adequacy of FDA enforcement of food and drug laws. Main point the group is likely to make is that FDA's current enforcement effort is feeble in terms of the job that ought to be done.

**Besides recommending increases in money and men**, the advisory committee is expected to say that there should be more stress on FDA "educational activities"—which presumably would lead to fewer violations and better Government-industry relations.

**As more than one million wheat growers went to the polls** in the crucial 1956 marketing quota referendum, here's how Washington viewed the prospects—depending on how the vote went:

**If two-thirds voted "yes,"** the strict production quotas would be continued. The recently announced support level would be high enough to encourage most growers to stick with allotments. Wheat surpluses would continue to decline, somewhat. The growers who came out ahead this year very likely could keep it up in 1956. The man who lost money this year could not expect anything better next—barring changes in his operations. A vote for quotas also would reflect willingness of growers to help in cutting down the surplus.

**If more than a third of those voting said "no,"** quotas would be out, support would drop to 50 per cent of parity (\$1.19 per bushel). Wheat plantings could jump at least 15 million acres over the acre allotment of 55 million, for there would be no effective control mechanism. Growers would try to make up in volume what they lost in price level.

**Congress and the other groups would be in a sweat** to forestall a demoralized wheat market. Secretary Benson has hinted he won't buck an increase in the minimum support level—and may even recommend one. Wheat state lawmakers would push even harder for a 1956 quota-less support price of 65 per cent of parity or more.

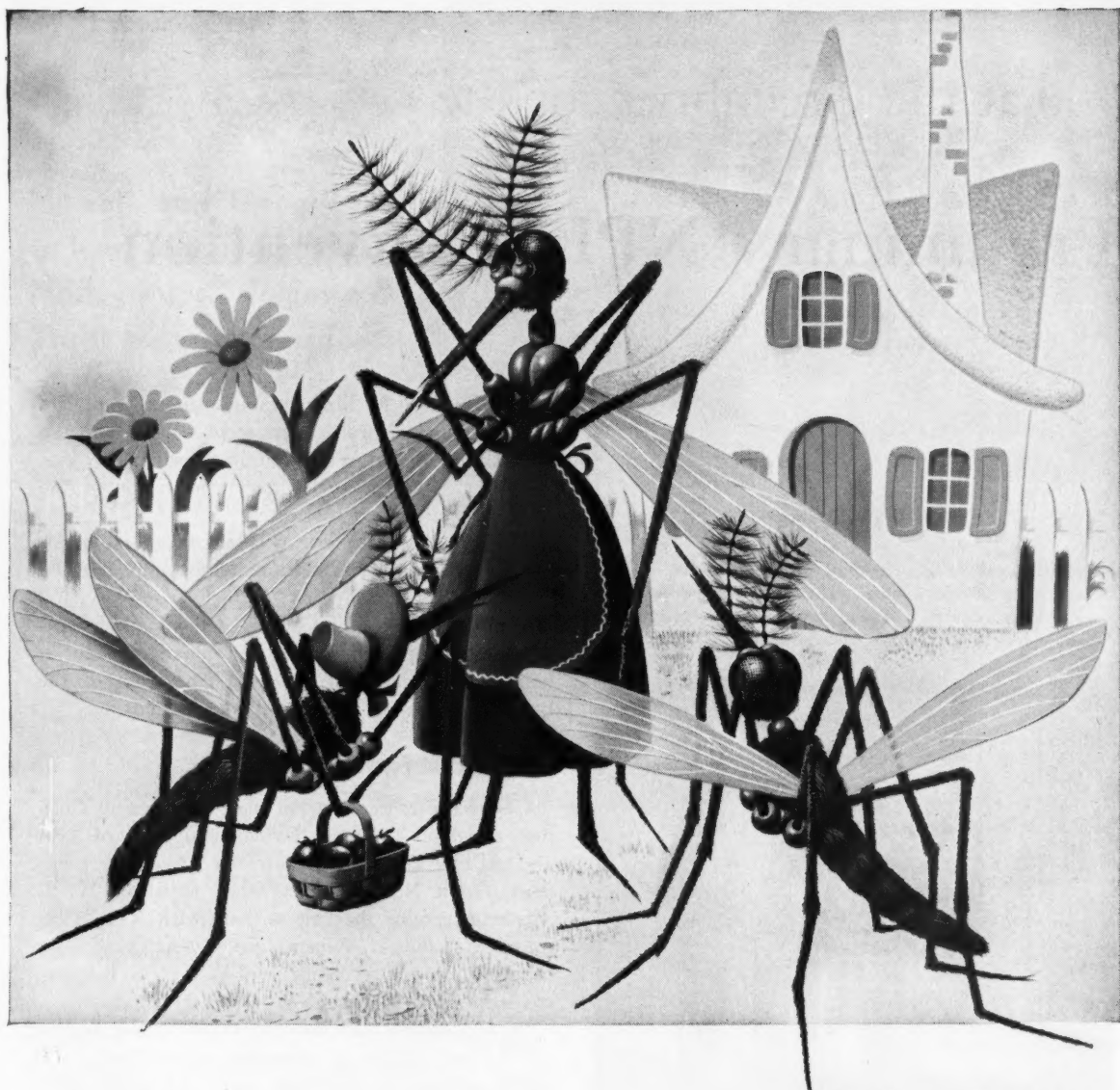
**Odds favored Congressional approval**—and a White House okay—for any such increase. There's growing feeling that 50 per cent supports for those who stay within allotment (which still would be in effect) would result in over-planting—which could depress the entire farm economy in 1956—a Presidential election year.

**A full-fledged dustbowl program still looks some way off.** The Soil Conservation Service is launching a speeded-up land capability survey, but can't complete this in less than 3 years. This survey, which tells what the land is best suited to produce, is the basis of any long-range dustbowl salvation operation.

**Besides the capability survey**, the blue-printed attack on the dustbowl includes: (1) Incentive payments, and Federal and state special tax credits, to be provided farmers who followed land-use recommendations. (2) More long-term, low-interest credit for those who follow recommendations. (3) Continuance of present federal emergency drought relief programs.

**Secretary Benson has reiterated his opposition to Federal purchase of dustbowl land**—as was done in the thirties—but the tone of his opposition indicates he might be persuaded.





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area such as a barn or shed interior.

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# 900 at the Greenbrier for the Preliminary NPFI Convention

Bill D. Gunter, Jr., national president, FFA, Live Oak, Fla.; Lamar Ratliff, 4-H representative, Baldwin, Miss.; Joe Strickland, Tom Dodson, National Junior Vegetable Growers Assn.; Bill Ward, Cornell U.



**S**OME 900 fertilizer manufacturers, suppliers and agricultural leaders were attracted to the Greenbrier at White Sulphur Springs, W. Va., June 12-15 for the preliminary convention of the National Plant Food Institute.

The combined American Plant Food Council-National Fertilizer Association memberships selected E. A. Geoghegan, Southern Cotton Oil company, and J. A. Howell, Virginia-Carolina Chemical corporation, as the top executives of the new trade association. Geoghegan will serve as Chairman of the Board of Directors and Howell as president.

## National Plant Food Institute Staff

Under the reorganization plan Dr. Russell Coleman and Paul T. Truitt, former paid heads of NFA and APFC, respectively, are executive vice presidents of the National Plant Food Institute; W. R. Allstetter retains the title he held with NFA, vice-president; Louis H. Wilson, formerly APFC director of information, is secretary; and William S. Ritnour, treasurer, formerly was NFA secretary-treasurer.

W. H. Garman and Malcolm H. McVickar, former APFC and NFA agronomists, respectively, will divide agronomic activities, and NFA public relations men Delbert L. Rucker and Peter C. Crolius will have similar activities in the NPFI.

Not involved in the reorganization are these NFA members: R. H. Engle, former film director, now with the FOA in India; Edwin C. Kapusta, former association chemical engineer, who became director of research for Potash Company of America on July 1; and John F. Gale, former economist for the group, now market research director for Garden Research Institute, inc.

Principal speakers at the convention were Assist-

Edwin Pate, Dixie Guano company, talks with Ervin L. Peterson, assistant secretary of agriculture.

## Howell and Geoghegan to lead combined APFC-NFA groups. Coleman & Truitt are vice-presidents

Top executives of NPFI are E. A. Geoghegan of Southern Cotton Oil, chairman of the board of directors, and J. A. Howell of Virginia-Carolina Chemical corp., president.



ant Secretary of Agriculture E. L. Peterson and Harold D. Cooley (D.-N. C.), chairman of the House Committee on Agriculture.

### Peterson on Farm Price Supports

Speaking on the problems facing agriculture, Peterson stated that price has been over-emphasized so that farmers have been encouraged to believe high price is the answer to all problems. "Somewhere along the line," he added, "it was forgotten that price without a market is a sterile element."

This, he claimed, is at least partly responsible for the surpluses, resulting acreage controls, freezing of production into uneconomic patterns and for the loss of some foreign and domestic markets.

He defined the current task as one of accommodating production to markets, while exercising every effort at further market development.

"The price support policy of the Department," Peterson continued, "is emerging as a dynamic, positive operation in the development of a sound agricultural economy" . . . not based in any way "on a desire to do away with price supports or to discredit them." He viewed supports as a market facilitating mechanism, measures that "should not be perverted to other purposes."

Government policy as described by Peterson is to make use of supports, where discretion exists, at a level as high as possible and still move farm goods to market without creating unmanageable surpluses in Government hands. Levels are intended to permit

producers to market in an orderly manner, and provide opportunity to prevent gluts at market time and finance means for orderly marketing through loans.

The outstanding farm need today, he said, is to establish comparative efficiency with industry and commerce and to better apply new knowledge. If agriculture "is to develop further its dynamic qualities and achieve adaptability," he stressed, "there must be an ever-constant flow of information to farmers about production, economics, markets . . . all areas which affect the farmer's actions and his thinking."

Peterson viewed with concern the "waste of human resources in agriculture . . . our greatest and most difficult farm problem." He cited a recent USDA report, "Development of Agriculture's Human Resources" as presenting a balanced program for more effective use of farm resources—especially by low-income farmers.

Farm life must be made attractive to capable young people, Peterson said; we must provide opportunity in agriculture for capable persons.

### Cooley Cites Anti-Farm Efforts

Representative Cooley charged that "there is a deliberate and vicious effort being made to cause consumers to rise up and to revolt against the farmers of our nation. There are those in high places who are making laborious efforts to bring about a revolt on the part of city consumers." He continued, "They are trying desperately to divide farmers into groups

M. D. Broadfield, Ark. Plant Food co.  
and S. L. Nevins of Olin Mathieson.



C. R. Martin, Miami Fertilizer co.; John R. Sargent,  
Federal Chemical co. and Tracy L. Adcock, Swift & co.



R. W. Breidenbach, Commercial Solvents;  
L. R. Boynton, U. S. Potash co.; and J.  
R. Taylor, Grand River Chem. division.

in the hope that they might bring about utter destruction of the entire farm program."

Cooley proposed a non-political public relations program for farmers designed to tell the truth about agriculture, bring all farmers together in a common bond and to cultivate understanding between farmers and their city customers.

Concerning the cost of the farm program, he reminded NPFI members that "When this administration came into office that 'vicious, unholy and un-American program,' the price support program for the basic crops through the Commodity Credit corporation, did not show a loss but on the contrary the program showed a net profit of more than \$13,000,000." Within about four months, he continued, this profit disappeared and "we had a loss of eight million dollars."

He pointed to the plight of tobacco farmers in 1939 when quotas were rejected and prices dropped to rock bottom levels. Without the support program, he added, "you probably would be attending creditors meetings like we held throughout the country just 20 years ago."

Cooley called on the plant food industry to support its customers by helping to tell the truth about our agriculture and farmers.

"Twenty years ago agriculture wanted a program and today we have a program," he continued, "but we are in danger of losing it. Let us not wait for another catastrophe to bring us to our senses. Our institutions of freedom cannot survive another great depression; our debt is too large; our task is too great."

#### Farm Youths in Forum Discussion

Moderator for a Youth Forum at the NPFI convention was W. B. Ward, head of the Cornell Department of Extension Teaching and Information and president of the American Association of Agricultural College Editors. The forum included representatives from 4-H, FFA and NJVGA organizations.

Ward reminded listeners that these youth groups are the best place for training young farmers the science of agriculture.

There are too many farmers who rely on the "It was good for Paul and Silas and it's good enough for me" philosophy, he commented, and our farm youth and their leaders must be relied on to change this adverse picture.



NPFI photo



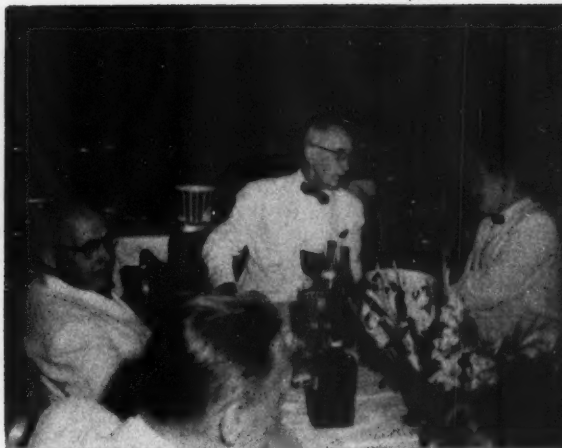
Dancing after the banquet Tuesday eve.

NPFI photo



Louis H. Wilson presents Soil Builders Award to V. C. Weidner.

NPFI photo



Talking things over at the convention banquet are Tracy Adcock, G. E. Pettit and William F. Price.

Part of buffet table at the Casino.

NPFI photo

## At The Greenbrier

*Here are some of the 900 industry leaders and their families who participated in activities of the National Plant Food Institute preliminary convention, at the Greenbrier, June 12-15.*

NPFI photo



Frank Kennedy, G. G. Pohlman wear smiles after copping doubles title.

NPFI photo



H. E. Lefevre observes Walter Meeken's form on putting green.

NPFI photo



Mrs. Schultz sights on the pin.

NPFI photo



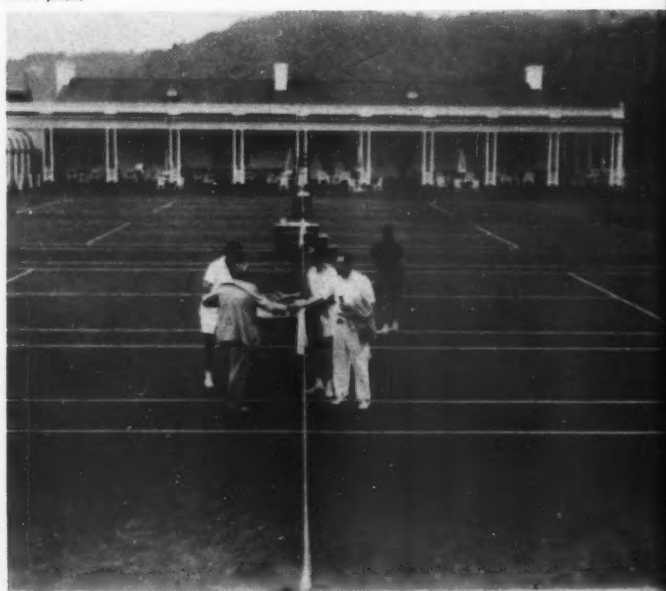
John D. Conner blasts out of a trap.



Gordon Cunningham and Ed Valliant get together.

Photos: Courtesy National Plant Food Institute  
by Peter C. Crolius  
Farm Chemicals Staff

NPFI photo



A foursome shakes after a doubles match on Greenbrier courts.

NPFI photo



Ralph Waltz jumps, hits outside.



Al Dickinson runs up on the ball.  
NPFI photo

NPFI photo

Bob Parks shows the skill that kept him long in the running.

NPFI photo

H. G. Cunningham, winner of top honors, pitches in the playoff.



Morse Smith at the first tee.  
NPFI photo



NPFI photo



Mrs. E. T. Evans, Mrs. A. R. Cahill, Mrs. Tom Leadley and Mrs. Louis Wilson.

Mrs. Moultrie Clement chats with Mrs. Russell Coleman in the lobby.



Mrs. Albert Woods, Mrs. C. Cecil Arledge, Mrs. John V. Collis, Mrs. L. Ralph Boynton, Mrs. Moultrie Clement and Mrs. Thomas F. Bridgers.

Mrs. J. A. Howell, Mrs. J. A. Monroe, Mrs. J. H. Zwemer & Mrs. R. S. Mueller.



Mrs. Tom Leadley, Mrs. Paul T. Truitt, Mrs. Dorothy Harper and Mrs. Tracy Cunningham take time out from their Canasta game for smiles. NPFI photo



NPFI photo



Mrs. Gene Van Deren, Mrs. Travis Whitsel, Mrs. G. E. Pettitt and Mrs. John Hall are shown participating in the Tuesday Bridge and Canasta Party. NPFI photo



At the Ladies Garden Party are Committeewomen Mrs. C. C. Arledge, Mrs. J. V. Collis, Mrs. T. F. Bridgers.





H. B. Mann, right, finishes his coffee with W. F. Price.

G. V. Taylor and H. C. Ihde.



A. D. Strobhar and Fred Techter have a talk.



NPFI photo



T. F. Bridgers looks over the sports awards.

Thomas E. Meylor and Warren C. Huff meet to talk.



Sohio's Bert Tucker, H. J. Coleman and Ed F. Merrill.



Earl F. Cline and Walter J. Sackett in the Greenbrier.



Claude Byrd, John Bennett, meet with H. S. Ten Eych.





## Chemicals

### 249—MGK Pyrethrum

If you produce formulations using pyrethrum forms of allethrin, McLaughlin Gormley King can be of service. MGK was a pioneer in development and processing of pyrethrum and, in addition to producing the clearest extracts, they have developed synergized concentrates, dusts and powders. For the latest authoritative data

CIRCLE 249 ON SERVICE CARD

### 250—CSC Metaldehyde

Metaldehyde is the subject of a technical data sheet from Commercial Solvents, describing the material and its application in the control of slugs and snails.

CIRCLE 250 ON SERVICE CARD

### 251—Pyrophyllite

Pyrophyllite is termed the ideal diluent and extender for insecticides by Glendon Pyrophyllite. Its insecticide grade material has a pH range of 6-7 and is very compatible with all major pesticide materials. For a pamphlet

CIRCLE 251 ON SERVICE CARD

### 252—Caustic Soda Chart

Diamond Alkali has issued a handy wall chart giving 37 specific suggestions on the safe handling of solid, liquid and flake caustic soda. Printed in two colors on coated linen stock, the 17" x 23" chart presents safety recommendations, protective practices and equipment and dissolving and unloading procedures. To get a copy company personnel responsible for handling of caustic soda can

CIRCLE 252 ON SERVICE CARD

### 253—W. Va. NH<sub>3</sub> Source

Columbia-Southern's Natrium W. Va. anhydrous ammonia plant is now operating at capacity. If you are interested in C-S as a possible source of your ammonia requirements get full information.

CIRCLE 253 ON SERVICE CARD

### 254—Cal-Nitro for Topdressing

Your customers may be interested in Cal-Nitro as a nitrogen topdressing. Available from Synthetic Nitrogen Products it contains 20.5 per cent N and at least 20 per cent calcium oxide equivalent. Packed in 100 lb. bags it is free flowing, fast acting and long lasting. For information on how you can add this product to your line

CIRCLE 254 ON SERVICE CARD

### 255—Moly Deficiency Test

Testing for molybdenum deficiency is the subject of a bulletin from Climax Molybdenum. There are several signs of moly starvation, some requiring testing, described in the folder. Climax points out that moly in fertilizers is crop insurance.

CIRCLE 255 ON SERVICE CARD

FREE INFORMATION to help you  
solve fertilizer, pesticide problems

## Reader Service

### 256—Ketona Solutions

Looking for a Southeastern source of NH<sub>3</sub> or nitrogen solutions? The new Ketona Chemical corp. plant at Ketona, Ala. scheduled on stream late this year, may be your answer. Located in a Birmingham suburb it is well situated for supplying nitrogen to fertilizers concerns in the SE. For information on Ketona nitrogen and its services

CIRCLE 256 ON SERVICE CARD

### 259—H & L Urea

Horse & Lion urea is stocked at all principal Pacific coast ports by Atkins, Kroll & co. Manufactured in West Germany it is available in 46 per cent nitrogen pellets or 44 per cent nitrogen pelleted and coated. Both grades are termed suitable for fertilizer and chemical use, flowing readily and mixing easily. For full information and prices

CIRCLE 259 ON SERVICE CARD

### How to use the READER SERVICE CARD

- Circle number of literature you want.
- Print or type your name, position, company and address.
- Clip and mail the Service Card.

### 257—New N Source

Here's another new nitrogen source ready to serve you beginning the first of 1956. Sohio Chemical will begin shipments of ammonia nitrogen solutions, nitric acid and urea to the fertilizer industry at that time. The plant at Lima, about 150 miles south and west of Cleveland, is located to serve a large Midwestern market. Sohio offers top technical assistance and the services of outstanding agronomists. For complete, product listing and price quotations

CIRCLE 257 ON SERVICE CARD

### 258—NCI Solutions

Northern Chemical Industries is now contracting nitrogen solutions and anhydrous ammonia to be delivered from its Searsport, Me., plant during the second quarter of 1956. If this new facility, now under construction, is well-situated to fill your requirements why not check now? For information

CIRCLE 258 ON SERVICE CARD

## Process Equipmt.

### 260—Munson Mixers

Multiple blending action gives faster, more accurate blending of dry ingredients in Munson rotary batch mixers. The units are available in capacities from 20 to 250 cu. ft., all with the special seven way mixing action, and can be fitted with internal spray for introduction of limited amount of liquid. For complete details

CIRCLE 260 ON SERVICE CARD

### 261—Pulva Catalog

Pulva corp. has revised and enlarged the general catalog describing its line of Pulva-Sizers, Com-Bin Feeders and auxiliary equipment. The section covering the feeders now includes added surge capacity and dimensional data for all sizes from one half to 857 cu. ft. Pulva-Sizers are built especially for granulating, wet milling and fine grinding; feeders handle dry, mastic, sticky or plastic materials. For a copy

CIRCLE 261 ON SERVICE CARD

### 262—Marion Mixers

An exclusive mixing and blending action in Marion mixers provides guaranteed uniformity according to Rapids Machinery. The design incorporates close blade tolerance, cross blending action, hardened steel drive gears and a high tensile strength shaft. Marion mixers can handle all types of dry materials blending, including introduction of liquids for a final mixed product. Both standard and heavy duty models are available in capacities from one half to two tons. For a descriptive bulletin

CIRCLE 262 ON SERVICE CARD

### 263—Air Classifier

The Gyrotron gravity system air classifier produced by Hardinge can be used with any type of grinding mill or as an independent unit to convey and classify simultaneously. Product is delivered directly to the bin and oversize returned to feed end of the mill for finishing. Low in operating cost, it produces a uniform sized product in a wide range of finenesses and capacities. For a descriptive folder

CIRCLE 263 ON SERVICE CARD

## Materials Handling

### 264—Mich. Lease Plan

Strapped for cash? You can still get that Michigan tractor shovel through Clark Equipment's Michigan Lease Plan. Under this pay-as-you-go plan you can put the machines to work without use of any capital. These units have many plus features—a bucket load nearly 50 per cent over rated capacity, top digging ability, low level bucket action and faster cycles through elimination of a clutch. For details on the lease plan

CIRCLE 264 ON SERVICE CARD

### 265—HS Buckets

Link-Belt has issued a folder on High Speed (HS) elevator buckets. Included is information on recommended head and boot designs, a quick check elevator capacity chart and recommended belt widths for single to quadruple rows of buckets. The units are built to handle maximum capacities of granular, free-flowing materials at high speeds and long life is assured by special construction features. For your copy

CIRCLE 265 ON SERVICE CARD

### 266—Chain Belt Idlers

Chain Belt has prepared data sheets on its toughing idlers and on return idlers especially for plant personnel. Both will assist you in determining the correct idler for any particular job after determining belt speed, weight of material handled, maximum lump size and life expectancy. For a copy of each sheet, mixers and formulators only can

CIRCLE 266 ON SERVICE CARD

### 267—G-W Oscilveyor

Gifford-Wood's Oscilveyor vibrating conveyor is described and illustrated in a 4-page bulletin. Photos illustrate the unit and its component parts and one section shows how to compute dimensions for the drive unit using standard 10-ft. trough sections. The company says the Oscilveyor is well adapted to handling of powders, flakes and other materials in bulk.

CIRCLE 267 ON SERVICE CARD

## Packaging

### 268—Snap-Open Sacks

Snap-Open sacks can boost your sales, claims Hudson Pulp & Paper; your customers get double economy. The easy opening units result in faster bag handling, and there are additional savings through reduced product spilling. Pouring is controlled from a thin stream to a hundred pounds by opening the bag a few inches or all the way. For more details

CIRCLE 268 ON SERVICE CARD

### 269—St. Regis Closure

A new end closure from St. Regis Paper, combines rayon thread and flat tape to reduce your per-thousand bag cost. Closures are stronger because of the high tensile strength of rayon thread, and the flat tape, matching in color and texture the body of the bag, provides an excellent printing surface. The thread can be sewn with finer needles, leaving smaller holes, and the thread withstands relatively high packing temperatures and resists corrosive chemical action. For information

CIRCLE 269 ON SERVICE CARD

### 270—Super-Ruff

Arkell & Smiths Super-Ruff kraft for multiwall bags gives 40 per cent more anti-slide insurance. They assure maximum ease in handling and provide greater product protection. Special Super-Grip inks provide added adhesive assurance. For complete information on these new packaging units

CIRCLE 270 ON SERVICE CARD

### 271—V-C Multiwalls

Extra care means better bags for your products, says Virginia-Carolina Chemical. This, plus modern bag-making methods, materials and machinery gives V-C multiwalls the ability to stand rough treatment when products are stored and shipped. For full details on the V-C line

CIRCLE 271 ON SERVICE CARD

### 272—Schachte Weigher

By attaching a Schachte automatic weighing device to your Exact Weight bagging scale you can convert manual bagging operation into a fast, accurate unit. Molony Fertilizer sells the device and reports that no structural changes are necessary for installation; it can be attached without any disruption of operation. For information

CIRCLE 272 ON SERVICE CARD

### 273—Auto. Bagging Scale

Richardson Scale's E-50 automatic bagging scale is completely described in a new 6-page bulletin. The unit is designed for high-speed bagging with consistent weighing accuracy and has a normal capacity range of 5 to 25 lb. or 25 to 50 lb. openmouth paper or textile bags. Line drawings suggest feeding arrangements for granular, powdered and pellet-size materials.

CIRCLE 273 ON SERVICE CARD

### 274—Metal Containers

A wide variety of sizes and styles of metal containers available from George D. Ellis & Sons are briefly described in a new folder. Illustrated are friction top cans, units of screw tops, decorated cans, special square and rectangular types and other Ellis products. The Ellisco line includes over 75 base sizes from which a infinite variety of finished containers can be developed for specific applications.

CIRCLE 274 ON SERVICE CARD

## Miscellaneous

### 275—Blaw-Knox Services

A small bulletin from Blaw-Knox describes the engineering and construction services available through its Chemical Plants div. The division handles all phases of work connected with chemical and fertilizer plants from preliminary surveys to initial operation of process plants. For a copy

CIRCLE 275 ON SERVICE CARD

### 276—NH<sub>3</sub> Applicators

A new series of tractor mounted NH<sub>3</sub> applicators for use with rear mounted tool bars has been added to the John Blue line, and a spring tine and spring trip or rigid truss frame type shanks are available, the latter for use under severe soil conditions. Applicators will fit tool bars from 1 3/4" to 2 1/4". For operator accessibility, the metering pump is located directly over the rear axle housing. For more information

CIRCLE 276 ON SERVICE CARD

See the Industry News section, pages 58, 59, 60 for information on these Reader Service numbers—

277—Pyronyl 75

278—Deactivator E

279—Cog Grinder

280—Cooler Unit

281—NH<sub>3</sub> Hoses

282—NH<sub>3</sub> Gauge

283—S & C Fittings

William D. Gunter, FFA national president, pointed out that soil building and sound agriculture are inseparable—"we must protect and properly use every acre on every farm in the country."

He cited the fertilizer industry as having "encouraged us to assume greater leadership in getting experiment station recommendations carried out on the farms. We have benefited from the technical 'know-how' and better judgment of many."

The 4-H Club representative, Lamar Ratliff, described his use of fertilizer in raising record corn crops and his efforts to bring in 300 bushels an acre.

Although he hasn't succeeded to date, last year he raised 218.5 bushels while the national average was about 27 bushels and this year is trying again to hit the 300 mark.

Two youths, Joe Strickland and Tommy Dotson, represented the NJVGA on the panel, presented a demonstration on soil fertility and improvement. Describing the use of deficiency symptoms in determining nutrient needs, they pointed out that correction is difficult for most farmers once the deficiencies have shown up. "Therefore," they concluded, "we recommend you do a good job of fertilization and avoid most of the trouble."

### Soil Building Editorial Awards

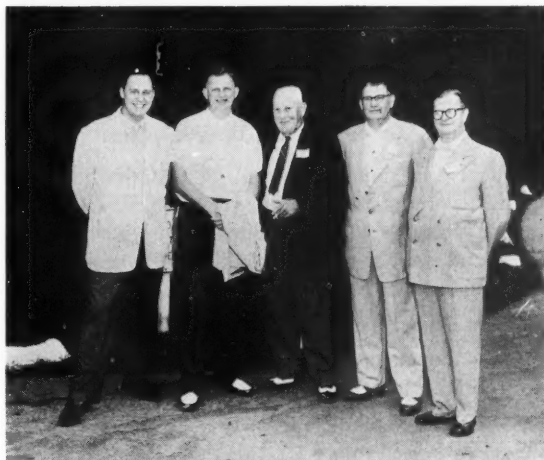
Presentation of awards for "superior journalistic contributions toward the building of the soils of our nation" was made to Kirk Fox, editor of *SUCCESSFUL FARMING* and to Tom Leadley, editor of the *NEBRASKA FARMER*. This was the second time that Fox received the award since the Soil Builders Award for Editors contest was started in 1952 with the approval of the American Agricultural Editors' Association.

Louis H. Wilson, NPFI secretary, presented scrolls signed by the seven nationally known judges, to Fox, representing the winner among magazines of more than 300,000 circulation and to Leadley, representing magazines of less than 300,000 circulation. A total of 44 farm magazines entered the contest.

A big feature of the program was the panel discussion of pesticide-fertilizer mixtures. See page 41 for *FARM CHEMICALS'* coverage of the discussion which included remarks by M. V. Bailey, American Cyanamid company; John D. Conner, Sellers & Conner; Rodney C. Berry, Virginia Dept. of Agriculture; Charles T. Harding, Virginia-Carolina Chemical corporation; and K. D. Jacob, USDA. ▲



NPFI exec. vice president, Paul T. Truitt, talks with board chairman E. A. Geoghegan.



W. B. Zimmer and Joe Harrel, Southwest Potash; Howard Thullbery, Superior Fert. & Chem.; Harold Hamby, Chilean Nitrate Sales and Tom S. L. Pope, Int. Fert. Ltd.

R. W. Breidenbach and Ward Jackson, Commercial Solvents; Ralph Boynton, U. S. Potash co.; Russell Coleman, NPFI executive vice president and S. T. Ellis, CSC.





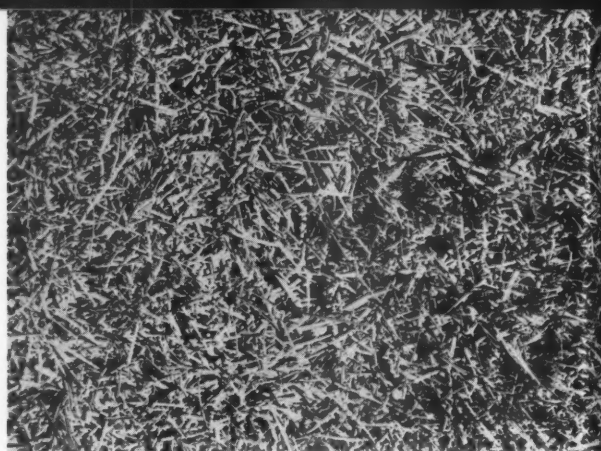
# First Commercial Urea-Formaldehyde Fert. Compound

URAMITE fertilizer compound, a mixture of methylene ureas, has been developed to the commercial stage by DuPont's Polychemicals department. The first urea-formaldehyde plant food compound to reach this marketing stage, it contains 38 per cent nitrogen and offers a prolonged release-rate never previously achieved in a nitrogen material.

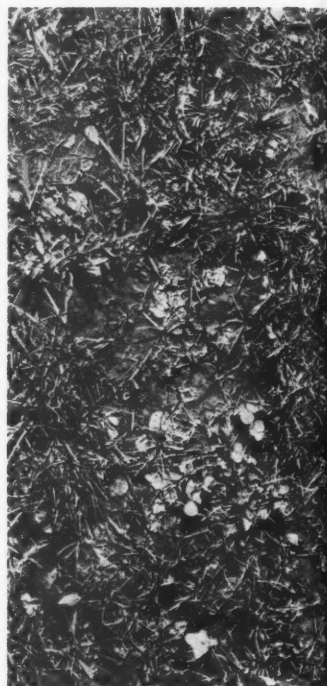
Initial supplies will be marketed through distributors to professional growers of turf and ornamental plants from DuPont's Belle, W. Va., plant.

Under development since 1938, Uramite has been found to produce a durable, attractive, healthy turf, results that are said to be apparent under both adverse and normal weather conditions. Ornamentals have shown outstanding responses with sturdier growth, compact hardy foliage and full flowering.

Only about 10 pounds per 1,000 square feet of turf are required for an entire season, and three pounds per 100 square feet of bed space are sufficient for most ornamentals. ▲



Effects of Uramite fertilizer compound on turf—dense growth, good color.



Adjacent strip of turf on which recommended amounts of usual soluble fertilizer was applied.

The dark strips of turf, from left to right, were treated with Uramite at the rate of 20, 30 and 40 pounds per 1,000 square feet. In many regions, maximum yearly requirements of N can be supplied with 10 pounds of Uramite.





Field operation economy is the one big advantage; experts view mixtures as a consumer demand and anticipate increased useage

## **Fertilizer-Pesticide Mixing**

### **Problems Discussed by NPFI Panel**

#### **MODERATOR**

**M. V. Bailey, Tech. Dir.  
Agr. Chemicals Div.  
American Cyanamid Co.**

"Those who will render the most service to their customers . . . are those who can approach the problem not as something unpleasant, difficult and expensive which should be avoided as long as possible, but as an opportunity to produce something the consumer wants or can use to advantage."

SERIOUS problems in industrial hygiene will result, stated Bailey, from handling pesticides in the fertilizer plant. "Prevention of air contamination with odors much worse than those created by fish meal, meat scraps or spent acid may be very expensive, or even suggest factory relocation." Other problems include teaching farmers to use such materials safely, investigation of possible harmful soil residues and effects on flavor and odor of crops.

This development, he said, is the result of four

main factors—farmers are suffering increasing losses from soil pests; available pesticides will eradicate or control these pests at reasonable costs for materials; many of these are compatible with fertilizers; and, in some cases, reduced labor costs result from combined application.

Together with other members of the panel, he emphasized that the only advantage of use found to date is that of economy in field operations.

## **LAWS & REGULATION**

"I predict that the general use of these mixtures will necessitate more laws and regulations. Before entering this field of operation both the pesticide manufacturers and the fertilizer manufacturers should consider the complications and responsibilities which must be assumed in the marketing of these mixtures."

**Rodney C. Berry, Dir.  
Division of Chemistry  
Va. Dept. of Agriculture**

ALTHOUGH sales of these mixtures are reported in some 40 states plus Canada, Hawaii and Puerto Rico, Berry reported that the bulk of sales to

date has been in a few Eastern and Midwest states.

While most fertilizer laws provide that the product shall not contain ingredients which might damage crops or soils, they do not require directions for use or warning against misuse on the label.

Pesticide legislation is stricter, and in most cases the manufacturer is held responsible if a product used

## fertilizer-pesticide mixtures . . .

### . . . LAWS & REGULATION

as directed "or in accordance with common recognized safe practice" is injurious to persons, animals or plants on which it is applied or to the applicator. Many other provisions can be cited in contrast to fertilizer laws.

Under the Federal act, the pesticide is the active ingredient and the fertilizer, the diluent or inactive ingredient, and such mixtures passing in interstate commerce must be registered.

If provisions of the laws are complied with, mixtures must be registered even though most control officials see the dangers of probable use and the difficulty of producing uniform mixes and advise against their use. "The only claim supporting the

use of fertilizer-pesticide mixtures which is not controversial in my opinion, is that based on the economics of the practice."

Berry read a resolution he presented to the Southern Association of Feed and Fertilizer Control Officials and which was adopted by this group, the fertilizer and pesticide national control official organizations and the Experiment Station committee on Organization and Policy.

This covers three points recommending that sale or registration be withheld without formal approval by state officials; stating the belief that danger of contamination of soils and crops is real and does not warrant the savings in labor costs; and recommending that all registered mixtures be properly labeled and meet all requirements of both fertilizer and pesticide laws.

## PRODUCT LIABILITY

**"... your production control procedure must serve two functions . . . assure that all batches of the material produced accord with the standard and with your guarantee . . . to enable you to trace back and determine if there was any deficiency in your product if it is later alleged to have produced injury."**

**B**ECAUSE the manner in which a potential injury may arise cannot be foreseen, the need for careful planning is all the more imperative, stated Conner. Any injury would probably arise from one or more of three basic deficiencies:

1. Lack of adequate research prior to marketing to determine product capabilities and limitations and methods of proper and safe use. When you market a product the responsibility is yours, and you assume the obligation of knowing this information.
2. Inadequate production controls or methods to assure accord with your standard.
3. Failure to label or advertise in accordance to law.

Don't feel that because a mixture is registered, it meets regulatory requirements—in a liability suit based on statutory violation, the jury, not the control official, will decide whether it met the law.

**John D. Conner  
Attorney  
Sellers & Conner**

✶ Injury could result from factors other than product deficiency—incorrect application or totally unrelated factors. But the growers will look for a cause and the pesticide is often chosen as the culprit.

Batch production records should show as a minimum the exact quantities of each ingredient, initials of the employee who calculated and weighed the quantities and source of all ingredients. If ingredient containers bear batch numbers, they should be recorded.

All production should be designated by batch number recording date and place of production and each separate batch produced, even if these are identical and consecutive.

Retain a representative sample for as long as practicable—if possible until the statute of limitations run out on any alleged injuries. This, in most cases, would be three years from date of application.

The batch number can be used to identify a package and, if liability action arises, permit reference to retained samples or to packages from the same batch in hands of other users.

If a container has been destroyed, the number can still be used if it is practical for you to record batch

numbers on your shipping documents and invoices. If you ship directly to the user, this may permit identification of a questionable batch, even though the container is destroyed.

The problem is more complicated when you ship to a distributor, but use of the numbers of shipping papers may provide precise identification or sharply limit possible batches.

A disclaimer, or non-warranty statement, is recommended as a standard part of your label, contract, invoice and other documents relating to sale of such mixtures. Although not a substitute for adequate labeling or a sound product, properly drafted and used it can be important in reducing your contingent liability. This is considered, by Conner, to be a job for your counsel.

## PRODUCTION & SAFETY

**Charles T. Harding, Gen. Mgr.  
Fertilizer Division  
Virginia-Carolina Chem. Corp.**

**"The fertilizer industry itself, I am quite sure, would rather not be called upon to furnish these mixtures; however . . . until a better and more economical means of applying these pesticides is found, I am quite sure we will find ways and means of mixing and delivering the goods. . . ."**

**H**ARDING surveyed a number of industry members, requesting their views on the subject of manufacturing and safety hazards in fertilizer-pesticide mixtures, based on their experience.

Proper mixing is essential, and best incorporation of insecticide materials results when liquid forms are sprayed on a pre-weighed amount of fertilizer. This is done in a batch or ribbon mixer, with the insecticide sprayed slowly on the tumbling mix. The mixer should make several revolutions after all liquid has been introduced.

Solid small granular material can also be mixed satisfactorily with the same type of equipment.

In some operations, liquid spray is calibrated and sprayed on top of fertilizer on a belt moving into the bagging machines, and a few mixers add the material in solid form as it is bagged.

Analyses on fertilizer-pesticide mixtures have varied considerably—obtaining a good mix and representative sample of the goods is still a problem.

Public relations could be a problem depending on plant location, with fumes, dusts or pungent odors resulting in neighborhood complaints.

Product liability experience has evidently been fair in the East and Midwest, but could be serious. "Most of the people the writer has contacted outside of our industry, but having close and very friendly dealings with us, say that the possible dangers from this subject alone would keep them from mixing the two materials."

Tags, labels and registration can also be very complicated for the larger plants shipping many grades into several states. Attaching multiple labels and tags would not be a simple problem.

Safety precautions must be taken, and most mixers have exercised great care. Dust masks, rubber gloves and other protective devices have been furnished by Harding's company, and in no case have men been exposed continuously for any great length of time.

Change-over must also be considered, and a number of men contacted reported they had certain hours or days to make deliveries of fertilizer-pesticide mixtures; others confined the mixtures to one or two grades with one specified amount of pesticide.

Those taking orders as they come state that there is a disruption of operations when several orders arrive at intervals during the same day, requiring varied analyses and mixtures.

New and more potent materials will be important, for once farmers are used to the mixes, the industry will be expected to continue their production regardless of how objectionable or dangerous new materials may become. "We are setting a precedent now that may be embarrassing at some later date."

If there were reasonable assurance that the practice will continue for even several years, the industry could afford to install proper equipment for uniform, economical production, eliminating most of the current problems.

## F-P MIXTURES IN 1953-54

"For the industry as a whole the outlook is promising for continued growth in the use of fertilizer-pesticide mixtures. . . . Expanded consumption is expected in 32 of the states, especially those comprising the North Central region."

**C**ONSUMPTION of fertilizer-pesticide mixtures during 1953-54 is estimated at 149,100 tons, 71.4 per cent above the previous year. This reflects, said Jacob, both a large increase in usage and more accurate data than that available for 1952-53 when 87,000 tons were reported.

Increases were noted in all regions but the West South Central and Pacific, ranging from about 15 per cent in the territories to 2,030 per cent in the West North Central. The latter area also registered the largest tonnage increase—40,600 tons. Together with the South Atlantic area (13,200 tons, 22 per cent) the two areas accounted for nearly 77.7 per cent of total consumption and 86.6 per cent of total increase over 1952-53.

South Carolina continued to lead the states with

**K. D. Jacob, Head  
Div. of Fertilizer & Agr. Lime  
Soil & Water Conservation  
Research Branch  
ARS, USDA**

30,000 tons used, followed by North Carolina, Iowa, Florida, Nebraska, Puerto Rico.

Consumption in the U. S. and territories amounted to only 0.96 per cent of total consumption of mixed fertilizers, with the proportion ranging from 0.01 per cent in the West South Central to 3.2 per cent in the West North Central, 3.5 per cent in the territories and 4.7 per cent in the Pacific.

Fertilizer-insecticide mixtures accounted for at least 95 per cent of the tonnage, and although some liquid fertilizer-pesticide mixtures were used, practically all was in solid form.

Solid mixtures of fertilizers and herbicides were widely used chiefly on lawns and turf, but in relatively small total quantity, and some use was made of fertilizer-fungicide mixtures.

Aldrin was used in largest total quantity with chlordane second and DDT a probable third. Arsenicals, BHC, dieldrin, heptachlor, lindane and toxaphene were among the other insecticides used and 2,4-D was the principal herbicide.

Aldrin ranked first by far in the North Central and Pacific regions and the territories, chlordane in the South Atlantic and probably in the Middle Atlantic and New England, and DDT appears to have been first in the East South Central and Mountain areas.

Addition of pesticides was made mostly to mixtures of two or more primary plant nutrients, primarily to complete goods, but in some instances additions were made to ammonium sulfate, triple and normal superphosphates, potassium sulfate and gypsum.

Increases are anticipated in all states in the Pacific and South Atlantic regions and for many in other areas except the West South Central, where further research could lead to increased usage. As previously noted, increases are expected to be greatest in the North Central area.

Registration or sales was noted in 51 of the 52 major U. S. political units, and there is evidence that mixtures were actually sold in practically all of them.

A gross total of 188 companies registered or sold these mixtures, according to reports by fertilizer control officials, but the actual figure was undoubtedly much higher. ▲

### Estimated Consumption of Fertilizer-Pesticide Mixtures in the United States and Territories

| Region                       | Fertilizer-Pesticide<br>Mixtures |                       |
|------------------------------|----------------------------------|-----------------------|
|                              | 1952-53<br>Short Tons            | 1953-54<br>Short Tons |
| New England . . . . .        | 400                              | 950                   |
| Middle Atlantic . . . . .    | 1,000                            | 1,800                 |
| South Atlantic . . . . .     | 60,000                           | 73,200                |
| East North Central . . . . . | 2,500                            | 6,700                 |
| West North Central . . . . . | 2,000                            | 42,600                |
| East South Central . . . . . | 200                              | 1,200                 |
| West South Central . . . . . | 100                              | 100                   |
| Mountain . . . . .           | 1,100                            | 1,450                 |
| Pacific . . . . .            | 11,100                           | 11,100                |
| Territories* . . . . .       | 8,700                            | 10,000                |
| <b>Total . . . . .</b>       | <b>87,000</b>                    | <b>149,100</b>        |

\*Puerto Rico only.



New compound from V-C laboratories  
registered for turf and ornamentals

# V-C 13 Nemacide Marketed



Both these grass plugs were taken from the same nematode-infested turf, after part of the green was treated with V-C 13. The long plug on the left shows how V-C 13 stopped nematode damage, helped roots grow deep. The plug at right, untreated, made only short, stubby root growth.

**A** BIG gain in nematode control measures was made with registration by Virginia-Carolina Chemical corporation of its new V-C 13 Nemacide in several states for use on turfs and ornamentals. A non-volatile, residual material, it is a distinct departure from the soil fumigant type materials currently used for nematode control.

Excellent control of these pests has been obtained with V-C 13 in Florida turf trials and through work at other Eastern locations. It is hoped that future research will extend the field of application to some crop plants, possibly cotton and tobacco. An organic phosphate, the material is known chemically as 0-2,4-dichlorophenyl 0,0-diethyl phosphorothioate.

First synthesized by Doctors Wm. P. Boyer and J. Roger Mangham at V-C's Richmond, Va. research laboratories, its effectiveness as a nematocide was discovered by Dr. J. R. Christie and V. G. Perry of the USDA Central Florida Experiment Station, Sanford, Fla. Now that some registrations have been com-

pleted, full scale production of the new compound is under way at the company's Charleston, S. C. factory.

Technical material is described as a dark, straw-colored liquid with a boiling point of 124°-130° C at 0.25 mm of mercury. Although insoluble in water, V-C 13 is readily soluble in most organic solvents and is formulated as a 75 per cent emulsifiable concentrate for application in a water emulsion.

It has been applied experimentally at rates equivalent to 125, 250 and 500 pounds of technical grade material per acre, and recommended dosages for field use range from 125 to 250 pounds.

## Report by Dr. M. A. Manzelli

Two members of the company's Research department biological group, Dr. M. A. Manzelli and Virgil Young, Jr., carried out research and field development programs. Manzelli, in a paper presented in

the PLANT DISEASE REPORTER, reviewed the characteristics of desirable nematocides and reported on the Florida field evaluations.

He commented that there is general agreement on the ideal material for nematode control—a substance toxic to a wide range of nematode species inhabiting a wide range of soil types, but non-phytotoxic. Most materials previously used for control of these pests have been soil fumigants toxic to nematodes, but also to most plant growth. Some of these have been used at reduced dosages on living plants but without satisfactory nematode control.

The V-C scientist points out that these tiny pests may be distributed in the soil to a reported depth of over six feet, a fact that has resulted in the belief that adequate volatility and water solubility are necessary characteristics of a soil fumigant for dispersion and contact with the relatively immobile nematodes. The effectiveness of such materials, known as non-residual nematocides, is rapidly dispersed.

### **Residual Nematocides Described**

A residual nematocide, he continued, implies a relatively non-volatile material with a small dispersion pattern. Some difficulty would be expected in effectively applying such a material to any great depth, but there are favorable combinations of soil type and plant growth which do permit the successful use of a relatively non-volatile, residual nematocide.

A good example, stated Manzelli, is the condition existing in nematode infested golf greens and other turf areas where the pests attacking the grasses, because of their close proximity to the surface, are susceptible to control with non-volatile residual materials applied as sprays or drenches.

The residual properties of such nematocides are effective in preventing rapid reinfestation which would occur with use of a highly volatile, non-residual material.

Spray or drench methods of application have been found best, and power sprayers, hose aspirators, or watering cans may be used. The usual procedure, as described by Manzelli, involves prewatering the dry turf, applying V-C 13 emulsion and again watering the turf so that all emulsion is flushed from the grass blades.

Hand operated injectors have been used although the task of application is more time consuming and tedious. One advantage of this method is that the nematocide is delivered more directly to the infestation zone.

### **Results of Florida Field Trials**

Florida trials last year included applications on St. Augustine, annual rye, Bermuda, Gene Tift and Everglades No. 1 grasses. When the material was applied during the warmer months of May, August and September to turf on a sandy loam, three to four weeks were required for improvement to be clearly visible. A five or six week period was needed in the colder months such as February, October and November on the same soil type.

Heavily infested turf on a muck soil, treated in August, did not show a marked improvement until eight to nine weeks had elapsed. Manzelli stated that it is thought movement in heavy soils is retarded, expanding the period of time needed for control.

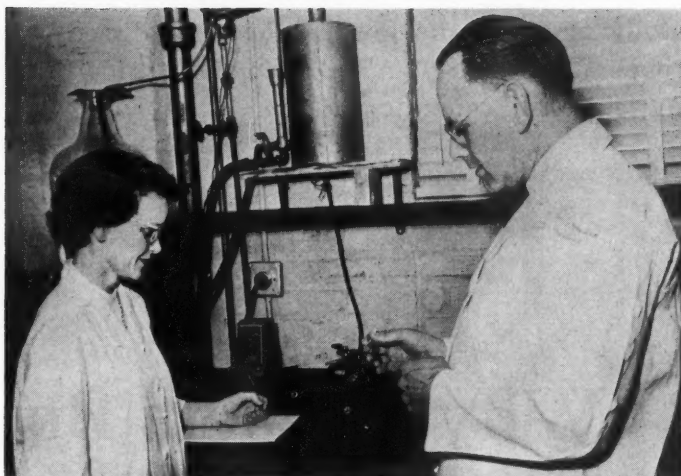
With heavier concentrations, 250 or 500 pounds per acre basis, by the drench or spray method, a slight phytotoxicity to grass blades was noted. Injury, characterized by browning of the blade tip, lasted for one to two weeks. However, Manzelli reported, grass roots were not injured in any of the tests as demonstrated by the new root growth that followed treatment.

The Florida studies as reported by Manzelli showed that, where the relative population or infes-



Greenhouse turf beds get the attention of Virgil Young and Dr. Arthur Manzelli, who conducted research and field development programs with V-C 13 Nemacide.

Analytical samples of V-C 13 Nema-  
cide are inspected in the laboratory  
by George Boyd and Lillian Watkins.



tation was light, treatment sometimes did not bring a marked change in turf condition. But striking improvements were noted in plots which had shown initially a very high relative nematode population and very poor turf growth.

Part of a green on which nematodes had completely destroyed the Bermuda grass cover, was treated with the result that a heavy growth of weeds was established. The remainder of the affected area was completely devoid of grass growth.

#### Good Results in Other Trials

In similar tests in the eastern part of the country, good results have been obtained at both 250 and 500 pound rates of application. Excellent grass response was noted, although the heavier dosage did cause a slight, temporary injury to grass blades.

A heavy soil type was involved in this work, and the time required to demonstrate the grass response was somewhat longer than that for the Florida tests on lighter soils.

While duration of residual life is still unknown, it is in excess of seven months at the 250 pound rate on sandy loam soil.

Although presently restricted to turf and ornamental applications, V-C 13 does show promise in controlling nematodes attacking citrus and truck crops. One member of the Florida Citrus Experiment Station, Dr. R. F. Suit, is reported to have extensive field tests underway investigating use of the material for control of the "burrowing" nematode, cause of spreading decline in Florida citrus groves. ▲

V-C 13 production specifications are discussed by George Allen and Charles Harowitz. Experimental quantities were initially synthesized by Harowitz, and Allen and S. M. Lane conducted pilot plant and eng. studies.

What causes farmers to begin using fertilizer? How do they learn about new plant foods? These and other questions on fertilizer acceptance by Iowa farmers are answered in a study made by the Iowa Agricultural Extension Service in cooperation with TVA's Division of Agricultural Relations, Agricultural Economics Branch.

## Why Farmers Buy Fertilizer

**M**ARVIN A. ANDERSON, Iowa State extension agronomy specialist, has summarized results of the work in TVA report no. 55-1, "Information Sources Important in the Acceptance and Use of Fertilizer in Iowa." It demonstrates the importance of knowing your customers and prospects, and many conclusions drawn from the study may assist you in developing a better sales-promotion policy.

In considering media effectiveness in practice acceptance the causative factors are placed in four groups: mass media, agricultural agencies, neighbors and friends, and salesmen. In summing the research on importance of different media in the various steps of fertilizer acceptance, this order emerges:

| Stage        | Order of Importance of Media |
|--------------|------------------------------|
| I. Awareness | 1. Mass Media                |
|              | 2. Agricultural Agency       |
|              | 3. Neighbors and friends     |
|              | 4. Salesmen                  |
| II. Interest | 1. Mass media                |
|              | 2. Agricultural agency       |
|              | 3. Neighbors and friends     |
|              | 4. Salesmen                  |
| III. Trial   | 1. Neighbors and friends     |
|              | 2. Agricultural agencies     |
|              | 3. Mass media                |
|              | 4. Salesmen                  |

#### IV. Acceptance

1. Neighbors and friends
2. Agricultural agencies
3. Mass media
4. Salesmen

This shows definitely the value of mass media in calling attention to a new practice and in providing early information about it. In the final stages, although agricultural agencies have the responsibility for extending new facts to farm people, they rank second in importance to neighbors and friends, a group of relatively small importance in the early stages.

Researchers have described the sequences that take place as an "idea" moves out from the position of a new practice to one widely accepted. There are five types of persons involved:

**1. The Innovator:** Always willing to try something new; will accept any risk to be first (and as a result is often criticized by neighbors); often owns a large farm, possesses high social and economic status; accepts leadership roles outside as well as within his community; usually has college training.

**2. The Early Adopter:** Considerably ahead of most farmers; usually younger, with more education, has higher social participation, reads more magazines and newspapers, participates more actively in farm organizations.

**3. The Informal Leader:** Not usually a designated leader on either appointive or elected basis but has many followers; has average education and experience, medium high social and economic position,



reads an average number of papers and newspapers.

**4. The Majority:** Older and with less education than the above; read fewer magazines, bulletins and newspapers, participate less in agency programs.

**5. The Nonadopters:** Older than majority, less education, lower social and economic status, participate less in farm organizations and agency groups, read fewer papers and magazines.

This framework can be used to provide a basis for organizing an educational or sales program to effect a practice change. Once the informal leaders are reached and accept use of a practice, they set the stage for rapid mass adoption.

In this Iowa study, fertilizer users were asked: "What one thing more than anything else caused you to start using fertilizer?" The answers are summarized in Figure 1.

Although over half cited other farmers as the most important causative factor, this does not preclude the possibility that they had information from other sources. It does reflect the important contact or medium which they recalled.

Of the 20 per cent crediting mass media, four-fifths claimed farm magazines, farm journals and daily papers as the most important sources influencing their fertilizer use. The remainder indicated bulletins and other material from Iowa State College.

### Characteristics of Average Users

What are some of the characteristics of average fertilizer users as compared to nonusers? They had larger farms, more capital, greater formal education, were somewhat younger and had fewer years of farming experience. Those on smaller farms and with less formal education were more frequently de-

pendent on experiences of others in appraising fertilizer use practices.

Other farmers were the most important original source of information for those with grade school education, and fertilizer salesmen and dealers were more important with this group than others.

Farmers with high school and some college education also credited other farmers as most important, with farm publications and state college materials also cited by those with some college education.

In general, the influence of neighboring farmers on acceptance was the most important factor regardless of length of fertilizer experience. Twelve per cent of farmers with three or less years of experience credited mass media as the primary source, while slightly over 20 per cent of those with greater fertilizer experience cited this factor.

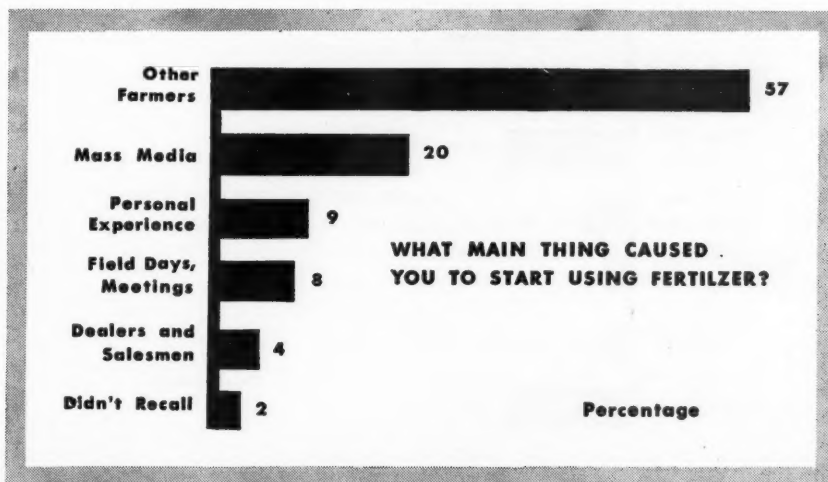
Those who had farmed for less than ten years were more influenced by home farm experience than those who had farmed for a longer period, and fertilizer salesmen and dealers had more influence among farmers with more experience.

Other farmers were more important to renters than owners-operators, and the latter group credited farm magazines, field days and demonstrations, extension meetings and bulletins with more importance than did renters.

Farmers with large farms appeared less dependent on others and credited reading of papers and bulletins and attending meetings as relatively more important in influencing acceptance of the fertilizer practice. Those with smaller units cited the fertilizer dealer and salesman with relatively more importance.

Less credit was given to other farmers by fertilizer users with over \$30,000 capital, and farmers with under \$10,000 owned capital were more likely to credit what other farmers told them about fertilizer use than their own observation. All other

**FIGURE 1.**  
"What one thing more than anything else caused you to start using fertilizer?"



capital groups credited what they had seen on other farms as the most important force.

The highest capital group was the only one crediting radio and TV, and they also rated meetings by county extension personnel much higher than others. With the exception of those in the lowest capital group, they credited the fertilizer salesman or dealer less than other groups. Field days and demonstrations were relatively more important to farmers in the two lowest capital groups.

### Information on New Products

Iowa farmers were also asked, "If you heard of a new fertilizer that has relatively low cost and is very effective in increasing crop yields, where would you seek information about its use?" Their response is tabulated in Figure 2.

Since the country farm bureau at the time of the survey was the legal sponsoring organization of the Extension Service, it might well be tied in with Iowa State College, with the result that 60 per cent of fertilizer users would look to the college as their source of data on new fertilizers.

Two-thirds of those who completed high school and over four-fifths of farmers with some college training indicated the college or farm bureau, and they also identified magazines more frequently than those with lesser education.

Farmers with grade school education and some high school would look for data at the PMA, SCS or vo-ag level more often than those with more formal training.

Renters credited the college more frequently than

owners and part-owners, and owners picked the county farm bureau to a greater degree than renters.

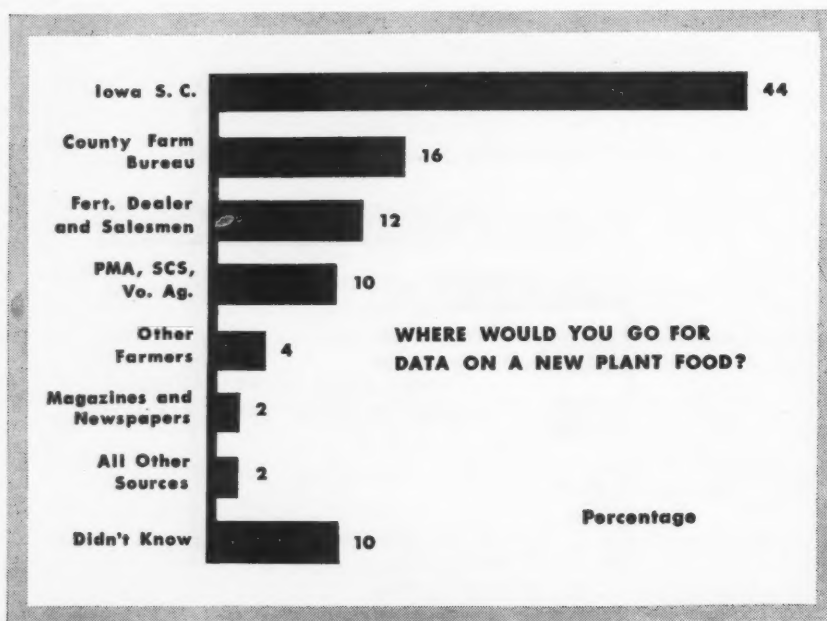
### Dealers and Salesmen

The importance of fertilizer dealers and salesmen increased when information was sought on new fertilizers. Only 4 per cent of fertilizer users credited them as the primary source of information leading to acceptance of fertilizer use, but 12 per cent indicated they would seek information from such sources when they heard of new products about to be placed on the market.

Results indicate the "strategic and increasing importance of fertilizer dealers and salesmen as sources of technical information during the current period of rapid technological change within the industry." An important result of the trend is that a greater burden is placed on handlers of fertilizer to have available for farmer distribution the most recent technical literature on plant foods and to be able to understand and answer questions that are raised.

As pointed out in the report, the apparent reversal of source preference may be explained by the knowledge stage of the farmer. When undecided about fertilizer use, he accepted the word of a friend or neighbor to confirm his preliminary opinions. The neighbors or friends were the "acceptors" and constituted the needed push for him to try the practice.

When considering use of a new plant food, he might reason that his neighbor would also be looking for such information and would be inclined to mention other primary sources of data. ▲



**FIGURE 2.**

**"If you heard of a new fertilizer that has relatively low cost and is very effective in increasing crop yields, where would you seek information about its use?"**

# Great Plains

## NH<sub>3</sub> Promotion

Trade group and agency develop complete ad-publicity package

**A**NDY AMMO, the thrifty Scot, is currently heading an advertising and promotion campaign for the Great Plains Agricultural Ammonia Association. Termed "The Nitrogen Man" by the group, his figure gives identity to the advertising of members and stresses the economic value of NH<sub>3</sub> usage.

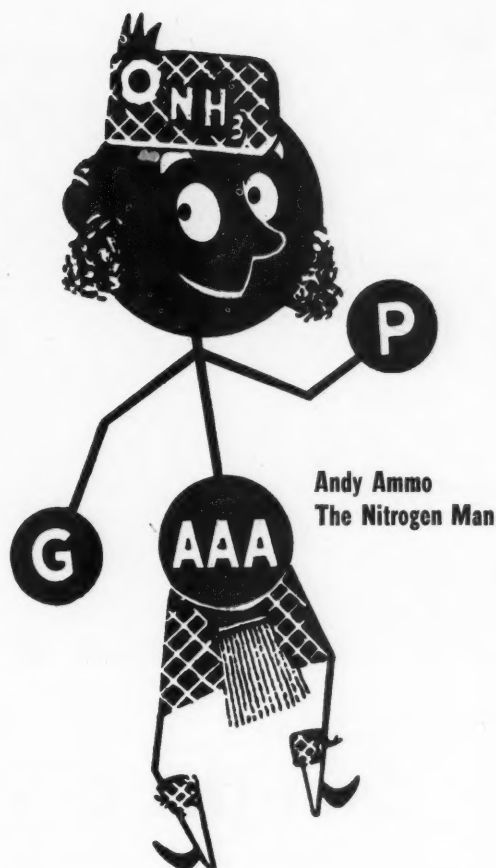
Headed by President B. A. Frankl, Mor-Gro, inc.; Vice Presidents George Gigstad, Nortonville Fertilizer company and Bob Jeep, Mid-West Fertilizer company; and Secretary-Treasurer James J. Andrew, Andrew Farm Store, Great Plains developed the program in recognition of the need for promotion materials to be used individually by its members. The difficulties of small organizations in preparing their own advertising and publicity messages are well known, for few can afford the necessary outside assistance on an individual basis.

To help solve the problem, the group selected the L. W. Ramsey Advertising Agency, Davenport, Iowa, a company already engaged in promotion activities for several associations.

The Ramsey organization developed a diverse selection of materials including ad mats, radio spots, classified ads, window decalcomanias, publicity articles and other sales helps for exclusive use of GP members.

Ad mats, supplied in one, two and three column widths, permit the user to develop his own space program. Ramsey stressed the value of a consistent program regardless of how ad space is contracted. Copy highlights economy, yields, fast action, N concentration and easy application.

Andy Ammo appears on each mat, and the adver-



tiser is identified as a member of the Great Plains trade group.

Classified ads have been arranged so that members need only add name, address and phone number before releasing copy. Messages are short and to the point, emphasizing economy and concentration.

Radio spots cover essentially the same points as space copy, suggesting that farmers look for Andy Ammo and his Scotch plaid design that "identifies your Great Plains Association Member."

Publicity releases are provided to help back up the advertising program with editorial mention. One piece cites membership in the Great Plains group, adding a plug for NH<sub>3</sub> and the service resulting from organization of distributors as a trade group. Another mentions the test plot that will be set up south of Ames, Iowa, on July 21 as a part of the July 20-21 GPAAA trade show.

Great Plains is also using the package in its drive to enlist new members. Prospects receive a sample kit of the copyrighted materials showing them one of the values of membership. The complete program is available without charge to the Great Plains membership. ▲



Johnson grass was dramatically removed by Vapam flooded at rate of 186 pounds per acre on plot now bare of weeds.

## Stauffer's Vapam Fumigant

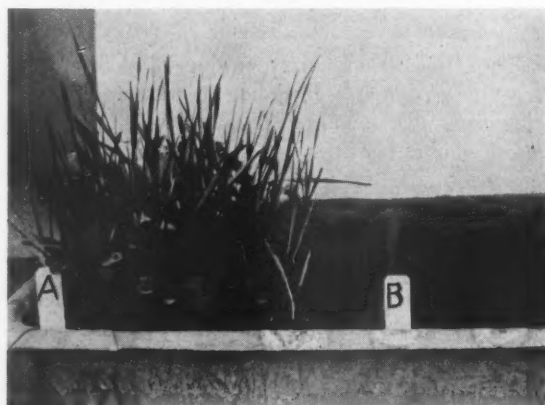
Versatile material effective on weeds,  
shows promise for some soil arthropods

**A**S A result of several years of intensive investigational work, Vapam (N-methyl dithiocarbamate dihydrate), an all-purpose soil fumigant, has recently been introduced to the trade under experimental Federal permit. A product of Stauffer Chemical company, Vapam has proven highly effective in the control of weeds and weed seeds, nematodes and soil fungi. It also shows promise for control of several species of soil infesting arthropods such as wire worms, the grape phylloxera, the garden centipede and the bulb mite. Vapam is much easier to use than most soil fumigants now available, and

it is expected to find new commercial uses due to its high effectiveness and ease of application.

Vapam was developed originally as a fungicide under Stauffer's laboratory code "Compound N-869"

Vapam applied to half of a flat. "B" shows how unwanted seeds may be destroyed in the ground by use of a pre-emergence drench.





and proved in early trials to be unusually effective against a wide range of soil pests. Low toxicity to man and animals and high water solubility were other characteristics of this compound which added to its value as a practical convenient fumigant for agricultural and home garden use.

Available as a four-pounds-per-gallon concentrate, Vapam decomposes rapidly in moist soil to release a penetrating gas which fumigates and then dissipates within a relatively short period of time. Suggested application methods include introduction directly into irrigation systems, spraying the concentrate in the plow-sole, sprinkling the ground surface with a dilute solution followed by rototilling or by deep or shallow injection. By all methods of application, penetration and effectiveness are improved by a water seal although excellent results have been obtained without a seal.

### Commercial Demands Developing

Because of its effectiveness against a wide variety of soil pests and ease of application, Vapam is finding commercial demand for seed bed treatment and specialty applications such as lawn rejuvenation and

home gardening. For temporary sterilization in these applications a dosage of  $\frac{3}{4}$  to 1 pound of Vapam per 100 square feet is required. The current price of Vapam is 75 cents per pound, making it competitive with other fumigants used for similar purposes.

### Investigating Use on Field Crop

The use of Vapam on field crops is being studied by Stauffer research personnel as well as by various institutional investigators, and thus far results indicate that weed, nematode and fungus control can be obtained at reasonable dosages. Application to the soil in field crop culture can be accomplished by injection, by metering Vapam into irrigation water or by spraying the concentrate across the plow sole. Application of Vapam in band treatment shows promise.

### Herbicidal Action

A very interesting phase of the development program consists of the treatment of various perennial crops for control of fungus and bacterial soil-borne diseases and for the control of root infesting insects

Untreated typical carnation plants in a problem greenhouse affected with soil-borne fungi.



After controlling soil fungi, these typical carnation plants show improvement in growth.

and nematodes. Although Vapam is highly phytotoxic there are encouraging indications that dilute drenches will control certain root diseases and insects and nematodes without causing permanent damage to established perennial plants such as grapes, peaches and avocados.

Another promising application for this new product is the treatment of soil before replanting trees in old orchard sites. Vapam with its broad spectrum of biological activity appears to offer unusual promise for this important problem.

The activity of Vapam as an herbicide is non-specific and non-systemic. Although of little value as a contact herbicide when applied to foliage, it has a very high activity against seeds, roots, rhizomes, tubers and corms when used as a soil fumigant. Much of the data on Vapam as an herbicide has been gathered on the West Coast with a variety of application methods. Flooding is convenient for growers who flood irrigate. Drenching has been effective and practical where sprinkler systems are used and where seed beds or small plots may be watered by sprinkling can or hose. Vapam can be injected into sprinkling systems or the home gardener can do a good job by simply attaching a cheap proportioner to a garden hose and applying the Vapam as he sprinkles. Excellent results have been obtained on Johnson grass, Bermuda grass, morning glory, purslane, Russian thistle, wild radish, golden rod, stinging nettle and many other weeds. The susceptibility of weed seeds to Vapam is extremely interesting because in most cases weed seeds are the real problem of weed control.

Like other soil fumigants, Vapam is more effective in light-textured soils than in heavy clay, or mulch, and the soil to be treated should be in good tilth with sufficient moisture content to insure maximum gas penetration. At least seven days should elapse between application and planting. With wet, very cold, heavy clay, or highly organic soils, Vapam may be retained for longer periods unless the soil dries or is aerated by cultivation. With particularly unfavorable soils, fall treatment and spring planting is suggested.

### One of Safest Fumigants

Vapam and its decomposition products may be irritating to the eyes or skin, but toxicological investigations have shown that it is one of the safest fumigants available. Vapam should not be used in enclosed areas where plants are present because certain plants are susceptible to the fumigant which escapes from the treated soil. Under such conditions, however, adequate ventilation may serve to prevent phytotoxic damage to plants in adjacent areas.

Further information may be obtained from the Research department of Stauffer Chemical company at Mountain View, Calif., or Chauncey, N. Y. ▲

## Plant Safety Tip #2

### Tractor Mis-Use



**The Accident** This not unusual case involved a 42 year old tractor driver employee of a fertilizer company. He had been hired by the concern about two months prior to the accident.

On an April morning last year the worker was engaged in hauling superphosphate from one of the plant bins. In filling the tractor scoop, he rammed the super pile with such force that he was thrown against the steering wheel suffering a fractured rib. Lost time: eight days of temporary total disability.

**The Cause** Very poor judgment in operation of the tractor while filling the scoop. Extent of training prior to the accident is unknown.

**Action Taken** All tractor operators were instructed in the proper use of their machines when engaged in similar tasks. The manager emphasized that drivers should NOT race into storage piles, they should instead dig into them when filling their scoops.

## Calendar

**July 14-15**—Southwest Fert. conf. and grade meeting, Buccaneer hotel, Galveston, Tex.

**July 20-21**—Midwest Trade Show & Field Day, Great Plains Agr. Ammonia Assn., Business session and show; Hotel Ft. Des Moines, Des Moines, Ia., Field Day, Ames, Ia.

**July 27-29**—Summer meeting, NE Branch, American Society of Agronomy, University Park (formerly State College), Pa.

**Aug. 8-10**—North Central div., American Phytopathological Society summer meeting, Wooster, O.

**Aug. 9-11**—Ohio Pesticide Institute meeting and field tour, Wooster, O.

**Aug. 10**—Ky. Fert. conf., Guignol Theatre, University of Kentucky, Lexington.

**Aug. 15**—Nat'l Joint Committee on Fert. Application with the American Society of Agronomy, University of Calif., Davis campus.

**Aug. 15-19**—American Society of Agronomy and Soil Science Society of American meeting, University of Calif., Davis campus.

**Aug. 15-20**—Farm & Home Mechanization Pageant, Mich. State College, East Lansing, Mich.

**Sept. 7-9**—National Agric'l Chemicals Assoc. annual meeting, Spring Lake, N. J.

**Sept. 7-9**—9th annual Beltwide Cotton Mechanization conf., Texas A & M College, College Station, Tex.

**Sept. 22-23**—Chemical Market Research Assn., Cavalier hotel, Virginia Beach, Va.

**Oct. 17-18**—Fertilizer section, National Safety Congress, LaSalle hotel, Chicago.

**Oct. 18-20**—Canadian Entomological Society of America, Fredericton, B. C.

**Oct. 27**—Middle West Soil Improvement Committee annual business meeting, Sherman hotel, Chicago.

**Nov. 2**—Annual convention, Pacific Northwest Plant Food Assn., Pilot Butte Inn., Bend, Ore.

**Nov. 3-4**—Northeastern div., American Phytopathological Society, Eastern Farmers Exchange, inc., 27 Central St., W. Springfield, Mass.

**Nov. 7-8**—Calif. Fert. Assn. 32nd annual convention, Hotel Mark Hopkins, San Francisco, Calif.

**Nov. 8-11**—American Council of Independent Laboratories annual meeting, Westward Ho hotel, Phoenix, Ariz.

**Nov. 17-18**—Nitrogen Solution field day, National Nitrogen Solution Assn., State Armory, Springfield, Ill.

# New AUGER-MATIC Valve Bag Packer

**SHAKES . . . SETTLES . . . AS IT WEIGHS AND FILLS  
CUTS YOUR BAG SIZE AND COST**

AUGER-MATIC fills, shakes and weighs paper valve bags all in one operation. Just push the starter button and when desired weight is reached it shuts off automatically. Cuts cost of bags and packing costs on powdered, granular, pellet and fibrous materials . . . reduces dust to a minimum.



**NEW!**

## Fill Valve Bags as Small as 10 Pounds

**Your Present Auger-MATIC is now more versatile than ever**

New small sizes spouts and augers now available to fit production requirements on 10 to 25 pound bags. You can change in a matter of minutes from packing 100 pound bags to the 10 pound valve bags . . . cut cost by using minimum size bags for exact weight desired.

For further  
information...  
call or write

**E. D. CODDINGTON MFG. CO.**

5026 N. 37th STREET • MILWAUKEE 9, WISCONSIN

**Gains shown in 1954 sales of liquid sprays  
& concentrates; powders, baits down.  
Insecticides still 1st in aerosols.**

## **CSMA Pesticide Survey**

**L**AST year sales of liquid insecticide sprays increased 21 per cent over 1953, according to George W. Fiero, Esso Standard Oil company, who reported results of the Third Insecticide Industry Survey at the mid-year meeting of Chemical Specialties Manufacturers Association. The figures, in gallons, were 10,433,000 and 8,614,000 respectively.

Fiero also said that sales of packaged sizes (including one gallon) rose to 8,161,000 gallons, an increase of 12 per cent. An upward trend in share of the market for packaged space sprays came to a halt in 1954 after three years, with a drop of four per cent. Chlordane residual type sprays constituted 35.44 per cent of the packaged market and, in bulk sizes, space sprays far outsold residuals.

An increase of three per cent was noted in sales of livestock emulsion concentrates in packaged sizes, with 129,769 gallons marketed. Bulk sizes increased from 18,119 gallons, up 179 per cent and total emulsion concentrate sales were 180,265 gallons, a 25 per cent gain.

Although other packaged emulsion concentrates gained only five per cent to reach 71,156 gallons, bulk sizes showed a big increase, 260 per cent, with sales of 220,115 gallons in 1954.

Figures released for oil base livestock sprays showed sales of packaged sizes at 891,750 gallons, up 31 per cent, and bulk sizes at 1,071,434, a gain of 22 per cent. Sales of 2,328,743 pounds of livestock wettable powders represented a drop of 35

per cent, but other powders increased 21 per cent, to 1,983,692 pounds.

Another big drop occurred with pastes, traps and baits, down 38 per cent to 1,587,838 units last year. Cattle smears were reported increased 26 per cent, a total of 124,306 units. Fabric pest sprays dropped 23 per cent to 263,687 gallons, although bulk sizes showed a gain.

Fiero stated that response to the 1954 survey was excellent with 70 firms reporting compared to 52 in the previous year. Because of the increased participation, data are more complete but are not altogether comparable to that of other years.

### **Aerosol Figures Also Reported**

Aerosol statistics were also reported at the CSMA meeting, but in a separate survey that was termed the most successful to date in number of companies reporting and in industry volume recorded. It covered all non-food pressurized packages from 53 United States and Canadian packers.

Insecticides have retained the number one volume position in the aerosol field although the reported figure of 43,179,070 units shows evidence of a leveling off.

The reported total is several million less than reported in 1953; however, since several of the aerosol fillers who did not respond are engaged primarily in insecticide packing, CSMA believes the actual figure is close to the 1953 level of 47,235,954. The accompanying table shows only reported volume. ▲



TABLE 1. Household and Industrial Insecticides Sales at Manufacturers Level, 1954

| Liquids  | Number of Units   |            |            |           | Over<br>One Gallon   |
|--|-------------------|------------|------------|-----------|----------------------|
|  | Less<br>Than Pint | Pint       | Quart      | Gallon    | (Data<br>In Gallons) |
| Space sprays—with knock down agents pyrethrin and activators, thiocyanates, allethrin, etc., with not more than 2% DDT.... | 1,030,738         | 8,281,698  | 3,005,201  | 384,993   | 359,419              |
| Residual sprays:   |                   |            |            |           |                      |
| With 2½% to 6% DDT, with or without other materials except chlordane, dieldrin or lindane.....                             | 791,356           | 8,145,559  | 2,934,644  | 330,689   | 76,470               |
| With chlordane, dieldrin or lindane with or without other materials.....   | 531,372           | 10,665,506 | 3,543,182  | 145,922   | 32,924               |
| Fabric pest sprays—products specifically intended for treating fabrics for moth control, etc.....                          | 800               | 825,058    | 343,291    | 21,877    | 52,805               |
| Livestock sprays—oil base products to be used without dilution.....  | —                 | 39,668     | 49,306     | 874,465   | 1,071,434            |
| Livestock emulsion concentrates—to be diluted with water.....  | 8,048             | 75,834     | 178,473    | 75,169    | 50,496               |
| Emulsion concentrates other than livestock—to be diluted with water (non-agricultural)                                     | 32,088            | 96,401     | 121,357    | 26,761    | 220,015              |
| Concentrates—to be diluted with petroleum base (non-agricultural).....   | 548               | 4,333      | 17,953     | 37,897    | 117,765              |
| Stored grain sprays.....   | —                 | —          | 392        | 48,002    | 291,505              |
| Totals.....  | 2,394,950         | 28,134,057 | 10,193,799 | 1,945,775 | 2,272,833            |

| Powders, Miscellaneous                                   | Data in Pounds        |                      | Data in Units       |                    |
|--|-----------------------|----------------------|---------------------|--------------------|
|  | Less than<br>5 Pounds | 5 Pounds<br>and Over | Less than<br>½ Pint | ½ Pint<br>and Over |
| Livestock wettable powders—to be suspended in water..... | 393,930               | 1,934,813            | —                   | —                  |
| Powders—for application without water.....               | 1,183,894             | 799,798              | —                   | —                  |
| Pastes, traps, and baits.....                            | —                     | —                    | 1,524,172           | 63,666             |
| Cattle smears.....                                       | —                     | —                    | 33,283              | 91,023             |
| Insect repellants.....                                   | —                     | —                    | 275,195             | 1,555              |
| Small pet insecticides—other than powders.....           | —                     | —                    | 20,021              | 3,177              |
| Totals.....  | 6,680,633             | 2,992,017            | 1,852,671           | 159,421            |

Table 2. Sales of Liquid Household Insecticide Sprays (Data in Gallons)

| Sprays        | 1953      | 1954      | Per Cent<br>of 1954<br>Market |
|---------------|-----------|-----------|-------------------------------|
| Packages      |           |           |                               |
| Space.....    | 2,090,754 | 2,235,926 | 33.05                         |
| DDT.....      | 1,634,952 | 2,132,005 | 31.51                         |
| Chlordane.... | 1,890,977 | 2,398,117 | 35.44                         |
| Totals.....   | 5,616,683 | 6,766,048 | 100.00                        |
| Bulk          |           |           |                               |
| Space.....    | 222,805   | 359,419   | 76.67                         |
| DDT.....      | 47,441    | 76,470    | 16.31                         |
| Chlordane.... | 25,230    | 32,924    | 7.02                          |
| Totals.....   | 295,476   | 468,813   | 100.00                        |

Table 3. Percentage Change 1954 Compared to 1953 (Data Shown as Increase or (Decrease) Over 1953)

| Product                     | Less<br>Than<br>Pint | Pint    | Quart   | Gallon  | Over<br>1 Gal<br>(In gal.) |
|-----------------------------|----------------------|---------|---------|---------|----------------------------|
| 1. Space Sprays....         | 4170.01              | 0.07    | (6.19)  | 53.94   | 61.32                      |
| 2. DDT Sprays....           | (4.46)               | 11.55   | 17.77   | 26.75   | 61.19                      |
| 3. Chlordane<br>Sprays..... | (39.85)              | 16.16   | 33.65   | 44.79   | 30.50                      |
| 4. Fabric Sprays...         | —                    | (35.66) | (32.62) | (1.13)  | 58.24                      |
| 5. Livestock<br>Sprays..... | —                    | 216.97  | (34.90) | 1.43    | 22.44                      |
| 6. Livestock<br>Emul. Conc. | (86.73)              | (12.52) | (10.39) | 21.62   | 178.71                     |
| 7. Other Emul.<br>Conc..... | 44.38                | 59.56   | (0.83)  | (19.53) | 260.08                     |

# Chemicals

## Bulletin Describes Prentox Pyronyl 75

An information bulletin on Prentox Pyronyl "75," has just been published by Prentiss Drug & Chemical co.

The company reports its new product is the latest development in the pyrethrum insecticide field, incorporating the rapid killing power and freedom from toxicity of pyrethrum and the stabilizing and insect repellent activity of piperonyl butoxide. It contains no kerosene, no odorless base oil nor any other solvent.

Most important area for use of Prentox Pyronyl "75," states Prentiss, will be in the field of grain protection.

**For a copy of the new bulletin, circle 277 on the Reader Service card.**

## Linck Markets Di-Met Crab Grass Herbicide

Di-Met, disodium monomethyl arsonate hydrated, is being marketed by A. E. Linck co. in both liquid and powder form.

In field and greenhouse tests, Di-Met has controlled crab grass without injury or discoloration to other desired grasses, according to Linck. The product's low toxicity which eliminates need of a poison label is another advantage cited by the manufacturer.

## Thrip Control Boosts Arizona Cotton Output

Early season insecticidal control of thrips in Arizona cotton boosted production 25 per cent, report USDA entomologists.

Tests conducted in 1954 on irrigated cotton at four widely separated areas resulted in yield increases from 526 to 1,216 pounds per acre. Toxaphene at one pound technical per acre for each application was used last

year, but previous tests had shown DDT, dieldrin and heptachlor to be equally effective.

The 1954 tests disprove the long-held belief that in Arizona, at least, thrips damage to cotton is unimportant. However, similar experiments in California appear to support this belief. California cotton responded to treatment as did Arizona cotton; grew faster and bloomed earlier—but showed no significant yield increase.

## New Velsicol Stabilizer For Endrin-Parathion

Louis P. Wilks, technical director, Velsicol corp., reports that the firm has developed Deactivator E as a stabilizer for endrin-parathion dust mixtures. Hexamethylenetetramine (HMT) was previously used but decomposed parathion preventing a stable mixture of the two toxicants.

Velsicol chemists working with American Cyanamid co. developed the parathion compatible deactivator for certain endrin carriers, and it is recommended only for use in endrin-parathion blends.

For a copy of a new Velsicol bulletin, "Suggested Formulations for Endrin-Parathion Dusts," providing a list of satisfactory carriers and diluents, formulators can **circle 278 on the Reader Service card.**

## Tolerance Petitions

A petition from Geigy Chemical corp. asks establishment of a residue tolerance of eight parts per million for acaricide chlorobenzilate (ethyl 4, 4-dichlorobenzilate) in or on apples, cantaloupes, lemons, oranges and pears.

California Spray-Chemical corp. and Stauffer Chemical corp. have filed a petition for establishment of residue tolerances of from 15 to 40 parts per million for captan on certain specified fruits and vegetables.

## USDA Reports Six Superior Rose Dusts

Multipurpose dusts that protect roses from most insects, mites and diseases have been developed by USDA scientists.

Tests at the department's Beltsville center since 1950 have turned up six combinations of pesticides of almost equal effectiveness. All are experimental and not now on the market.

All six of the superior mixes contained 5 per cent DDT and 1 per cent lindane, plus one of the following fungicide-miticide combinations: (1) 3.4 per cent copper, 25 per cent sulfur, 1.5 per cent Aramite; (2) 3.4 per cent copper, 25 per cent sulfur, 4 per cent malathion; (3) 7.6 per cent ferbam, 25 per cent sulfur, 1.5 per cent Aramite; (4) 7.6 per cent ferbam, 1.0 per cent Karathane, 1.5 per cent Aramite; (5) 6 per cent zineb, 1.5 per cent Aramite; (6) 6 per cent zineb, 1 per cent Karathane, 1.5 per cent Aramite.

## Niagara Pyrenone 606 Gets USDA Approval

Niagara Chemical division's new Pyrenone 606 spray has been accepted by USDA for use as a liquid grain protectant, a fruit fly spray or industrial and livestock spray. The material is an oil-free emulsifiable concentrate containing 60 per cent piperonyl butoxide and six per cent pyrethrum.

## Millmaster Intermediates

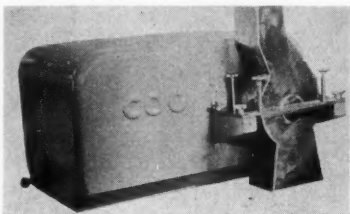
Development of three new organic intermediates, Benzyl Ethylene Oxide, 1-Chloro 3-Phenyl-2-Propanol and Benzyl Ethylene Glycol, has been announced by Millmaster Chemical corp.

The company suggests Benzyl Ethylene Oxide as a stabilizer for chlorinated hydrocarbons and as an active diluent for epoxy resins.

## Equipment & Supplies

### RS279. Cog Grinder

Cog corp.'s new impact-in-air comminutor is designed for continuous processes. Variations include units for size reduction of wet or dry products; spray blending of dry and wet ingredients for intimate blending with accurate formula ratio and reducing



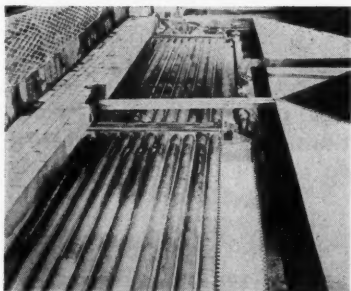
size, if needed; and for combining heat and size reduction in "thermal comminutor."

Sizes range from 3 through 300 hp and the machine can be made in a variety of material variations. **For information, circle 279 on Reader Service card.**

### RS280. Cooler Unit

Falls Industries reports combined use of Impervite and Graph-I-Tite to produce a practical, economical cascade cooler which permits efficient cooling of corrosives at temperatures to 700° F in the open atmosphere.

Illustrated is an FI unit at Michigan Chemical corp., a se-



ries-flow type vertical bank unit with adjustable water distribu-

JULY, 1955

tor. Immune to attack of most corrosives, it has a high rate of thermal conductivity and features low thermal expansion.

**Specific information is available through 280 on the Reader Service card.**

### Bulk Floor Display

Can you use this merchandising idea? Produced by Hinde & Dauch and used by McMillen Feed Mills to display its products, the bulk floor "universal" display permits illustration and examination of Master Mix feed and concentrates.

Several pounds of bulk material are displayed in the top bin with copy inviting customers to



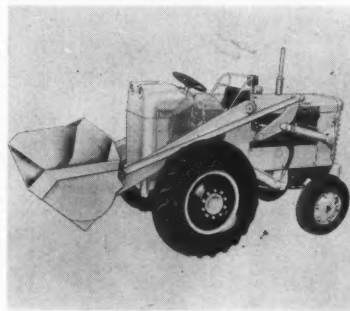
"See it—Feel it—Smell it." A series of rear risers add to the unit's versatility permitting a multiple selling job.

### New TL-10 Bucket

Tractomotive corp.'s TL-10 Tracto-Loader is now equipped with a larger bucket and 25° tip back at ground level. Formerly a  $\frac{3}{4}$  cu. yd. unit, the redesigned bucket now has a full cubic yard capacity. An increase in bucket

width plus the machine's 11 foot turning radius makes it suitable for most loading operations.

The automatic tilting action during the raising cycle has been



retained so that at the low carrying height of three feet the bucket is tipped back to an angle of 45°.

### RS281. New NH3 Hoses

Thermoid co. has added three new anhydrous ammonia types to its line—Amoflex No. 1 for bulk loading, No. 2 for delivery and storage handling and No. 3 for application from portable field tanks. Working pressures are 350–400 psi, 350 psi and 150 psi, respectively.

**Use 281 on the Reader Service card for more data.**

### Pennsalt Resin Coat

Pennsalt's Corrosion Engineering dept. now offers a low-cost test trial kit of Thick-Coat, a resin coating product for humid and corrosive atmospheres.

The Thick-Coat system provides a durable protective coat on new or corroded metal, concrete or wood surfaces exposed to fumes, corrosive atmospheres and spillage of destructive chemicals. Good flow qualities permit application as with ordinary paints.

## RS282. NH<sub>3</sub> Gauge

A magnetic liquid level gauge, the Criterion, for anhydrous ammonia storage and applicator tank use has been developed by Rochester Mfg. co.

Featuring a new headplate design, the gauge is tested to with-



stand 1,200 psi and a shrouded gear assembly transmits float arm movement to the dial. A snap-open dial permits field replacement of a damaged dial without removal of the entire gauge or emptying of the tank.

For information circle 282 on the Reader Service card.

## Y & T Two-Skid Truck

Double skid handling capacity is available with a special Yale & Towne dual lift platform truck which handles two skids simultaneously.

The 4,000 pound capacity truck is fitted with two independently operated platforms which can be separated to a maximum vertical distance of 62 inches.

## Chase Bag Flattenape

Inventories go smoother with Flattenape, a new Chase Bag introduction. Available in a variety of colors and sewn across the bottom of multiwall bags as

a closing tape, it serves as ready identification of the contents when bags are stacked and the printing surfaces are not visible.

Chase says the sharp, clear printing of the customer's log-type or other copy is flattered by the smooth finish surface and a variety of colored inks that contrast with the tape. Natural kraft tape is also available in the same texture.

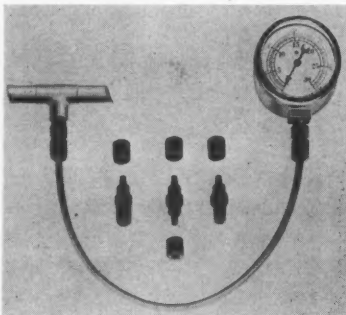
## Level, Flow Detectors

Three variations of a standard electronic level and flow detector-indicator are available from Fielden Instrument div., Robertshaw-Fulton Controls co.

A tube-in-probe Tektor insures accuracy in controlling levels of substances with low electrical conductivity; the differential Tektor offers one instrument level control in vessels where a definite differential must be maintained between high and low points; and the time delay Tektor is designed to control flow of material delivered erratically.

## RS283. S & C Fittings

New, smaller sizes of polyvinyl chloride fittings and adaptors for connecting polyethylene and other flexible tubing have been developed by S & C Manufactur-



ing co. Suitable for tubing-to-tubing and tubing-to-pipe connections, the units resist action of solids such as sulfuric and many oxidizing agents.

For a catalog of S & C products, circle 283 on the Reader Service card.

## Suppliers' Briefs

**Arkell & Smith's** appointments: Lloyd H. Finke named Chicago district sales manager, Doug Young, assistant; Phil Rariden, Louisville, Ky., district representative; S. R. Seymour, Philadelphia district representative.

**Fulton Bag and Cotton Mills** has named Wm. R. Blackburn and Alvie M. Strickland sales representatives in the Texas area; Charles R. Bronaugh, sales representative at Kansas City, Kan.

**St. Regis Paper co.'s** Chicago offices are now consolidated, together with the Chicago traffic dept., at 18 S. Michigan Ave., zone 3. The company reports acquisition of all common stock of Pollock Paper corp. Organization will remain unchanged and management continued as in the past.

St. Regis personnel moves: Howard C. Peterson, Jr., named assistant general sales manager, Kraft div.; John F. Gruber, district manager, Multiwall Packaging div.'s Eastern district, now expanded to include the former Southeastern district with Wm. H. Versfelt, Jr., and Wm. T. Orr as assistant district managers of the southern and northern areas respectively.

**Union Bag and Paper corp.'s** E. L. Corrent is new multiwall bag sales representative for the Rocky Mountain states with headquarters at Denver.

A new addition to **Vulcan Stamping and Manufacturing co.'s** plant will allow all freight cars and trucks to be loaded while under cover.

**C. H. Wheeler Mfg. co.** has sold its Fine Particles Grinding dept. to Fluid Energy Processing and Equipment co.

FARM CHEMICALS



## Oxidation of Phosphorus with Steam

US 2,706,146, by Lawrence B. Hein, Donald W. Rindt, John F. Shultz and Grady Tarbuton, and assigned to Tennessee Valley Authority, describes a process for the oxidation of phosphorus with steam to yield phosphoric acid and hydrogen, without substantial formation of phosphine or phosphorous acid. The vapor-phase reaction has not been successful up to this time, because of the formation of these by-products, which reduce the yield and also make the phosphoric acid unsuitable for use in the manufacture of products used in foods or in fertilizers.

As shown in Fig. 1, the process is carried out in two stages. Superheated steam and superheated phosphorus vapor are admitted to a primary catalytic converter (2) containing a catalyst such as copper supported on zirconium pyrophosphate. Substantially all the phosphorus is oxidized to trivalent and pentavalent states, but not all the phosphorus is oxidized to  $P_2O_5$ . The products of this reaction pass into a secondary reactor (7) which is filled with packing such as Raschig rings of

carbon. A temperature below the dew point of the gaseous reaction mixture is maintained in the secondary reactor. In this reactor, phosphoric acid is condensed and phosphorous acid is converted to phosphoric acid. Concentrated phosphoric acid trickles down through the packing, and is withdrawn at the bottom.

Uncondensed or uncollected gases and vapors, which contain hydrogen, water vapor, entrained phosphoric acid, and a small amount of phosphine leave the secondary reactor and pass into a cooler (13) which is also filled with packing and is cooled externally by means of a water film distributed over the surface by a spray ring (15). Upon cooling of the gas-vapor mixture, water is condensed and mixed with the phosphoric acid to form dilute acid, which is withdrawn at the bottom through a trap (16). Any unreacted phosphorus that might be present in the vapors is condensed in the cooler and, being more dense than phosphoric acid, collects at the low point of the trap, from which it is removed periodically. Hydrogen, containing a small amount of phosphine, is withdrawn from the top of the cooler for subsequent treatment to remove the phosphine, if desired.

### Method of Treating Dormant Plants

US 2,706,678, issued April 19, 1955 to Frank E. Denny and assigned to Boyce Thompson Institute for Plant Research, inc., discloses a new method of controlling plant growth.

It has been found that lauryl bromide has the specific property

by Dr. Melvin Nord

## PATENT REVIEWS

of delaying or inhibiting the growth of new plant tissue. The compound may be applied to the plants in dispersed or diluted forms such as vapors, sprays or dusts.

For example, the lauryl bromide may be applied to potatoes during dormancy so that the potatoes may be stored for relatively long periods of time without sprouting.

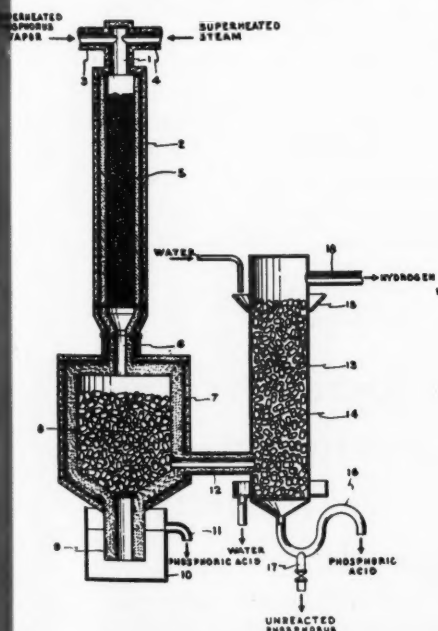
### Promoting Uniform Seed Germination

In US 2,706,151, issued April 12, 1955 to Edgar W. Clarke, Robert B. Doan and Vincent J. Keenan, and assigned to the Atlantic Refining co., uniform germination of seeds is obtained by immersing the seeds in a plant growth regulant composition consisting of a surface active agent, a water-soluble salt of chlorophyll and potassium phosphate. According to the inventors, the three substances individually have no such effect, but when used together they do.

### Flotation Concentration Processes

US 2,706,557 and 2,706,558 by Wesley M. Houston and Harvie W. Breathitt, Jr., assigned to Minerals & Chemicals Corp. of America, describe processes for concentrating phosphate ores by flotation.

US 2,706,559 by James B. Duke, assigned to the above company, describes a process for flotation concentration of potash ores. A high grade concentration of finely divided sylvite is produced and also a coarser concentrate of lower grade, suitable for use as a fertilizer. ▲



*Presented in cooperation with  
the Economic Insect Survey  
Station, Plant Pest Control  
Branch, Agricultural Research  
Service, USDA.*



# PEST REPORTS

## New Records of Insects

### Citrus Black Fly

THE citrus blackfly, which until May 31, 1955, was not known to be in the continental United States, was found in Brownsville, Tex., on that date. This infestation was found on a single lime tree on the grounds of a tourist court located near the city limits on the Harlingen Highway. There are no commercial citrus groves in this immediate area. The find consisted of egg spirals and unemerged pupae on two leaves of the tree involved.

An intensive survey had, to the time of writing this report, failed to reveal any additional infestations in the area. A cooperative eradication spray program was immediately undertaken. State, Federal and industry are cooperating in this program. Prior to this find the citrus blackfly was known to be in Mexico, Central America, the West Indies, Cuba, Philippines, China and India.

### Mediterranean Fruit Fly

The Mediterranean fruit fly, a serious pest of citrus and one of the few insects known to have been eradicated in the continental United States, has again been found on the North American continent. This insect has recently been reported from Costa Rica where it has been found established in the central plateau on an area of approximately 30 by 70 kilometers. Infestations

were found to be heavy in peaches and moderate in oranges and other citrus.

The Mediterranean fruit fly has a wide variety of hosts among which are many citrus and deciduous fruits, including oranges, grapefruit, peaches, apples, plums, pears and about 100 other cultivated and wild fruits. The pest was found in Florida in 1929, and an intensive control program aimed at eradication was launched. The program was successful with no specimens having been found in Florida since July 1930.

### Vegetable Weevil

The vegetable weevil, one of the important vegetable insects in this country, has now been reported from Kentucky and Missouri. This insect was found first in the United States in Stone county, Miss., in 1922. With the exception of California, from where the weevil was reported in 1925, the pest for several years confined its damage to a limited section adjacent to the Gulf of Mexico.

The weevil, thought for years to be confined to the southern states and California, has gradually spread in area, not reaching southern Virginia until 1945 and Maryland in 1952. For several years after discovery of the insect in this country, the principal vegetables attacked were those such as turnips, carrots, tomatoes, potatoes and cabbage. Since

that time it has become a pest of practically all vegetables, as well as tobacco and certain flowers. As in the case of all insects, clean culture is beneficial in helping to keep down the population of vegetable weevils.

Chemical controls recommended consist of applying a 5 per cent DDT dust or spray to the soil and a 1 per cent rotenone dust or spray to infested plants. Do not apply DDT to parts of the plants that are to be eaten unless you are certain that the residue can and will be removed by washing or stripping.

### Alfalfa Weevil

The alfalfa weevil, which was first reported in the eastern United States from Maryland in 1952 and since reported from Delaware, New Jersey, Pennsylvania, West Virginia and Virginia, in early June of this year was reported from North Carolina and Washington. The insect was reported from Granville and Vance counties, N. C., and from Austin county, Wash. The North Carolina infestations yielded slightly over six larvae per 100 sweeps, while specimens from Washington were collected from roadside alfalfa.

## General Insect Activity

### Grasshoppers

During the latter part of May and early June grasshoppers were

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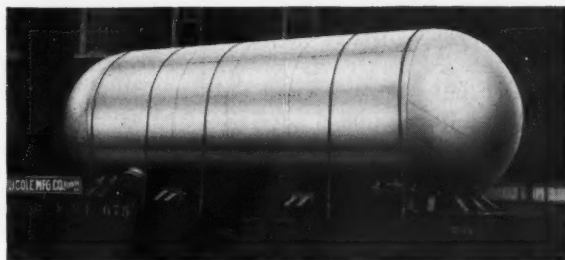
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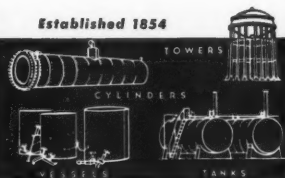
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among the insects causing most concern. In New Mexico grasshoppers were the primary concern with infestations on more than 1,000,000 acres as of early June with the expectation that the area would become larger. Of the known infested area 750,000 acres were in Lea and Chaves counties. In Quay county near Nara Visa an estimated area of 40,000 acres had an average population of 50 grasshoppers per square yard. Economic infestations were also present on large acreages in Roosevelt, Union, Colfax, Harding and Dona Ana counties. Cooperative control programs have been initiated in several of the infested areas.

In Texas widespread infestations ranging from medium to heavy were reported from the north-central area to the Oklahoma line. Missouri is facing a severe situation with populations higher than at this time last year. Populations in field margins ranged up to 300-400 per square yard with alfalfa being more heavily damaged of the crops attacked.

In Oklahoma, 20 to 70 per square yard were appearing in the western area. The heaviest infestations in that state appeared to be in Jackson and Comanche counties.

Other states reporting either threatening or damaging populations in some areas included Utah, Arkansas, Illinois and South Dakota.

### European Corn Borers

Damage by small European corn borers was appearing extensively in corn in Delaware early in the month, and egg masses of the pest were reported in several states. Egg counts on tallest corn in Illinois averaged 200 per 100 plants, while Ohio had 20 masses per 100 plants on early corn, and central Iowa 55 masses per 100 plants. It was predicted that hatching would be general

in the central area of Iowa by June 10 and in northern parts of that state by June 18. Hatching was occurring in Massachusetts and treatment was required in early fields.

Alabama reported damage by this insect to corn in Cullman, Morgan and Marshall counties. This is believed to be the first damage to corn by this insect in this state. By early June also, pupation was complete or nearly so in Nebraska, South Dakota and Missouri. Borer development was reported to be earlier than normal in several areas, with activity approximately two weeks ahead of schedule in Illinois.

Iowa entomologists have reported an average of more than 14,000 live borers per acre—better than three times the population at the same time a year ago. In northeast Nebraska, average infestations were found to run 22,000 borers per acre. South Dakota entomologists have noted an extremely high winter survival—77 per cent in some localities.

USDA reports that cooperative research between the department and several state experiment stations has shown DDT, applied as a spray at 1½ pounds actual toxicant per acre, provides the best control of borers in young corn.

### Armyworm

Although the armyworm had caused widespread damage in some areas, especially Georgia, North Carolina, Missouri and Kansas, the situation as a whole was not as serious up to June 10 as in the preceding two years. By that date also, the infestations were clearing up as far north as Tennessee and central Missouri. The yellow clover aphid attack on alfalfa was also subsiding in Arizona and Oklahoma but New Mexico still reported serious populations in the southern half of the state. ▲

FARM CHEMICALS



## Literature

**Handbook of Food and Agriculture**, edited by Fred C. Blanck. \$12.50. Over 1,000 pages. Reinhold Publishing corp.

Contributed by 29 leading authorities in foods and agriculture, the 26 chapters of this handbook cover a wide variety of scientific

information. Only about one-fifth of the volume, however, is devoted to farm chemicals and emphasis is placed on food products, preservation, engineering and processing. A few chapters relate to soils, fertilizers and pesticides.

Authorities writing on the farm chemicals field include Eric Winters, soils; C. L. W. Swanson, soil fertility; Charles Thom, soil

microbiology; A. L. Mehring, fertilizers; C. C. Roan, pesticides; and L. P. Miller, growth regulators.

Included are data on the Federal Food, Drug and Cosmetic Act, pesticide residue amendments and the Federal pesticide (proposed) tolerances.

The handbook can be ordered through FARM CHEMICALS' Book Department.

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## FERTILIZER MATERIALS MARKET

### New York

*June 13, 1955*

**Sulfate of Ammonia.** Most of the large coke oven producers are making concessions in price for summer delivery with a graduated rise in prices over the fall months.

**Nitrate of Soda.** Continuation of present price schedule expected by most of the trade and demand steady.

**Urea.** Demand reported slow from the fertilizer trade, but industrial users said to be taking larger supplies than usual.

**Nitrogenous Tankage.** Prices were mixed, as some producers held to their original schedule of prices and other producers were willing to make concessions. Prices range at present from \$4 to \$5.10 per unit of ammonia (\$4.98 to \$6.20 per unit N), f.o.b. shipping points.

**Castor Pomace.** With production at the low point for the year, producers were able to dispose of their material at a steady price of \$37.50 per ton, f.o.b. shipping points.

**Organics.** As the fertilizer season drew to a close and many manufacturers went to the convention at White Sulphur Springs, trading was limited to the immediate needs of the buyers. Blood and tankage sold at \$5 (\$6.08 per unit N), f.o.b. Eastern shipping points, with most feed buyers out of the market at the present time. Soybean meal was available at \$48 per ton in bulk, f.o.b. Decatur, Ill., which is a drop of about \$5 per ton in the last month.

**Fish Meal.** Offerings were scarce particularly in the South as buyers awaited the new catch fish. Fishing operations are proceeding on schedule but because

of limited imports of fish meal, the market was stronger than some other proteins. Fish meal is available for prompt shipment at \$133 per ton, f.o.b. fish factory.

**Bone Meal.** Trading was limited on the basis of \$70 per ton, f.o.b. production points. Some imported material was available for feed at \$67.50 per ton, f.o.b. ports.

**Superphosphate.** Some price shading was reported from scattered Southern points but in general prices were steady. Triple superphosphate was in plentiful supply for the first time in a number of years.

**Potash.** New price schedules were announced this month by various producers with only minor changes. With supplies plentiful, buyers in some cases are holding off placing orders for the new season.

### Philadelphia

*June 13, 1955*

The raw materials market is seasonally quiet and some inventories are building up. It is expected that the total movement of materials during the closing season will be found short of the 1953-1954 volume, although some sections report improvement. Several prices for the coming season have been published, and there are practically no increases. In fact, on some articles discounts from the base price are granted for taking early deliveries. The use of liquid nitrogen in place of the solid forms is steadily increasing. Packing-house products are weaker. Superphosphate is in very good supply.

**Sulfate of Ammonia.** Supply is ample with demand rather unstable. One new price schedule, it is said, indicates \$42 per ton

as base price, with discounts of \$3 per ton for June-July delivery; \$2 for August-September, and \$1 for October-November, in bulk.

**Nitrate of Ammonia.** There has been a fairly good demand for direct application, and the supply is ample for all present requirements. One new price schedule continues the present price of \$68 per ton for 33½ per cent, in bags, carloads at producing plant, with freight equalized.

**Liquid Nitrates.** It is expected that present prices will continue through the new season, although one producer is said to have suggested a slight price increase after Jan. 1, 1956. Supplies are fully adequate.

**Blood, Tankage, Bone.** The market for these materials is definitely down and demand practically absent. Blood and tankage are quoted at \$4.75 to \$5.25 per unit ammonia, (\$5.77 to \$6.38 per unit N), depending on location. Bone meal is quiet at about \$70 per ton. Nitrogenous tankage is obtainable at \$4.50 per unit ammonia (\$5.47 per unit N) with no urgent demand at this time.

**Fish Scrap.** Market for menhaden meal is more or less nominal at about \$134 per ton, but there are signs of tightening on news that fishing is poor.

**Potash.** Several price schedules have been published, with prices varying, but there is every likelihood that competition will bring them all to approximately the same level. However, it looks as though the prices will range no higher than the past season, and may average slightly under. The past season's business is said to have been fairly satisfactory. Present stocks and producing capacity are large.

## Super Production Up Slightly Last Year

Domestic superphosphate production rose slightly in 1954 to 2,214,710 tons APA from the 2,147,462 ton output of 1953.

| Production (tons 100% APA) |           |           |
|----------------------------|-----------|-----------|
| Grade                      | 1954      | 1953      |
| Total                      | 2,214,710 | 2,147,462 |
| Normal*                    | 1,604,155 | 1,678,459 |
| Enriched*                  | 40,360    | —         |
| Concen.                    | 561,870   | 457,235   |
| Wet-Base                   | 8,325     | 11,768    |

### End of Year Stocks (tons 100% APA)

| Grade     | 1954    | 1953    |
|-----------|---------|---------|
| Total     | 326,579 | 290,794 |
| Normal*   | 216,221 | 236,313 |
| Enriched* | 5,985   | —       |
| Concen.   | 101,557 | 51,304  |
| Wet-Base  | 2,816   | 3,177   |

\* Normal and enriched combined in 1953 and through June, 1954 to avoid disclosure of individual company operations.

During the period from December 31, 1953, through the end of 1954, stocks also rose, from 290,794 to 326,379 tons.

In all figures reported for January through June, 1954, data on enriched super were included in those for normal grades, so that the accompanying table shows only last half output and stocks for the enriched material.

March, 1955, production of superphosphate amounted to 228,764 tons (100 per cent APA), 9 per cent over February and about 0.5 per cent higher than March, 1953.

Shipments of all grades totaled 196,441 tons, an increase of 43 per cent above February and 20 per cent more than March, 1953. Stocks on hand at the end of the month were 21 per cent less than on March 1 and 17 per cent more than at the end of the same month last year.

## Inorganics Production

Figures released by the Bureau of the Census shows that March production of synthetic anhydrous ammonia, phosphoric acid and sulfur acid exceeded all previously reported monthly output figures.

## Statistics

### Kentucky Releases 1954 Fertilizer Data

Figures of Kentucky fertilizer sales, by county, have been made available for the first time by the state agricultural experiment station.

A tabulation of 1954 distribution shows that 580,410 tons were sold during the year, 459,440 as mixed goods. Top mixed grade was 3-12-12 followed very closely by 5-10-15 with 6-9-6, 4-12-8 and 2-12-6 next in importance.

Normal superphosphate, ammonium nitrate, fused tricalcium phosphate and muriate of potash were the most used straight materials. During the first half of 1954, 356 tons of nitrogen solutions were applied directly and direct application of 1,128 tons of anhydrous ammonia included 1,065 tons in the first half.

## Production — March, 1955

Compiled from Government Sources

|   | Unit    | March       |             | February    |
|---|---------|-------------|-------------|-------------|
|   |         | 1955        | 1954        | 1955        |
| <b>Chemical</b>   |         |             |             |             |
| Ammonia, synth. anhydrous   | s. tons | 285,239     | 237,535     | 249,398     |
| Ammonia, liquor, coal & coke (NH <sub>3</sub> content)                | pounds  | 3,056,935   | 3,113,558   | 2,353,872   |
| Ammonium nitrate, fert. grade (100% NH <sub>4</sub> NO <sub>3</sub> ) | s. tons | 158,285     | 131,892     | 148,645     |
| Ammonium sulfate  |         |             |             |             |
| synthetic (technical)   | s. tons | 115,606     | 79,203      | 98,239      |
| coke oven by-product  | pounds  | 166,258,291 | 142,926,392 | 143,563,519 |
| BHC (Hexachlorocyclohexane)   | pounds  | 3,045,914   | 6,372,722   | 1,824,331   |
| Gamma content   | pounds  | 547,354     | 901,371     | 328,789     |
| Copper sulfate (gross)  | s. tons | 6,904       | 6,656       | 6,156       |
| DDT   | pounds  | 10,456,387  | 8,035,605   | **9,319,119 |
| 2,4-D Acid  | pounds  | 3,314,507   | 2,739,774   | **2,792,270 |
| esters and salts  | pounds  | 2,807,512   | 2,514,670   | *1,725,145  |
| esters and salts (acid equiv.)  | pounds  | 2,098,813   | 1,935,911   | *1,284,269  |
| Phosphoric acid (50% H <sub>3</sub> PO <sub>4</sub> )                 | s. tons | 1308,415    | 264,625     | *289,323    |
| Sulfur, Native (Frasch)   | l. tons | 434,568     | 472,445     | 400,270     |
| Recovered   | l. tons | 32,300      | 30,000      | 28,100      |
| Sulfuric acid, gross (100% H <sub>2</sub> SO <sub>4</sub> )           | s. tons | 1,387,831   | 1,223,936   | 1,265,996   |
| Chamber Process (100% H <sub>2</sub> SO <sub>4</sub> )                | s. tons | 237,186     | 230,461     | 225,969     |
| Contact Process (100% H <sub>2</sub> SO <sub>4</sub> )                | s. tons | 1,150,645   | 993,475     | 1,040,027   |
| Superphosphate (100% APA)   | s. tons | 228,764     | 227,696     | *210,165    |
| Normal (100% APA)   | s. tons | 158,555     | 181,684     | *144,717    |
| Enriched (100% APA)   | s. tons | 4,164       | —           | 3,585       |
| Concentrated (100% APA)   | s. tons | 65,286      | 45,050      | 61,225      |
| Wet Base (100% APA)   | s. tons | 759         | 962         | 638         |
| 2,4,5-T Acid  | pounds  | 207,464     | —           | *345,085    |

\* Revised.

\*\* Partly estimated.

<sup>1</sup> Includes quantities for 2 plants previously not reporting.

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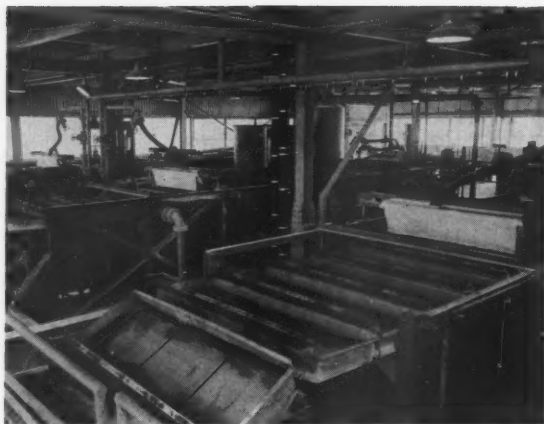
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DEPT. FC-755, UTICA, NEW YORK



Three Dorr-Oliver traveling pan filters, each with 12 sq. meters of filter area under vacuum, separate strong phosphoric acid from waste gypsum at the plant.

## Highest Analysis Farm Goods from MFA Joplin

MISSOURI Farmers Association's new granular fertilizer plant near Joplin, Mo., attained design capacity of 200 tons per day in March, only three months after initial production. The five million dollar factory is producing the highest analysis complete plant goods ever manufactured for general farm use with main output to date in 14-14-14, 14-28-14 and 12-36-12 compounds.

A 4,000 foot pipeline carries 94 per cent sulfuric acid from Eagle-Picher's Galena, Kan., plant and this is reacted with Florida phosphate rock to produce 32 per cent phosphoric acid. A gypsum precipitate is separated using three traveling pan filters, units consisting of traveling pans attached to an endless belt. Developed in Italy and capable of handling concentrated acid while continuously maintaining filter medium at peak efficiency, they are now used in one other US installation and at several overseas plants.

After filtration the phosphoric acid is concentrated to 37-56 per cent in single effect evaporators and shipped to other plants or used in the fertilizer production section.

At the Joplin plant a fluid slurry with varying proportions of phosphoric and sulfuric acids, phosphate rock and anhydrous ammonia is blunged with potash and fine product, dried and screened.

Using the newly developed Dorr ammonium phosphate process, MFA has become the first company to make such concentrated granular plant foods. ▲

FARM CHEMICALS



# FEEDING AND FERTILIZER MATERIALS

(SINCE 1898)

## SAMUEL D. KEIM

1343 ARCH STREET  
PHILADELPHIA 7, PA.



# TRIPLE SUPERPHOSPHATE

46 to 48% Available Phosphoric Acid



20% SUPERPHOSPHATE

Sales Agents: Bradley & Baker  
155 East 44th St. New York, N. Y.

U. S. Phosphoric Products

Division

TENNESSEE CORPORATION

Tampa, Florida

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## Business Financing

**D**URING the past month we read an article in the *GUARANTY SURVEY*, monthly publication of the Guaranty Trust Company of New York, concerning a relatively new method of business financing that may well spread to many sections of the country—the formation of institutions that have been aiding primarily the small business man.

These institutions, known as development credit or business development corporations, are designed to fill the void caused by virtual disappearance of the local investor. At one time many well-to-do citizens were willing to take financial risks in the hope of substantial rewards, but now, with the current tax rates on individual incomes and with the capital-gains tax, these fund sources have become fewer and fewer in number. Tax-exempt investments have become much more attractive to such individuals.

The first of these new organizations was formed during 1949 in Maine, and similar corporations now operate in New Hampshire, Rhode Island, Massachusetts and Connecticut. Groups are also being organized in New York and Vermont.

Each is a state-wide organization established and financed by banks, insurance companies, other business organizations and, in some cases, individuals. Funds are raised by issuing stock and by borrowing from "member" institutions, which are not necessarily stockholders.

**S**TOCKHOLDERS come from the business community, while members are financial institutions, mostly banks and insurance companies with a few building and loan associations. With the exception of Massachusetts and New York organizations, banks are not permitted to hold stock.

Financial institutions become members by agreeing to supply funds as called for by the organization, up to a specified "loan limit," a low percentage of each member's capital and surplus or other comparable measure as defined in the charter.

Loans, intermediate or long-term, and other aids are extended to small businesses deemed worthy of credit but which have been unable to obtain it from other sources.

The most common need supplied by the loans is that of working capital. Next in order of importance

are equipment purchases, new construction and refinancing of existing obligations.

That the New England groups have aided essentially the small business is demonstrated by figures showing that 90 per cent of the firms aided have fewer than 300 employees and more than 80 per cent, fewer than 100. Most are engaged in manufacturing and were already in business.

The average size of loans has been moderate with the Maine group granting sums up to \$75,000 with an average of about \$20,000 while the Massachusetts average has been about \$100,000. Maturities vary, usually from five to ten years.

Regular payments, mostly on a monthly basis, are required and there is a general practice to take collateral security for loans, although some advances are made on an unsecured basis. Interest rates are usually six per cent.

**L**OANS are often made on a participation basis with regular financial institutions and local industrial foundations in which case the credit group is usually subordinate to the financial institution but prior to the foundation. They never compete with regular financial houses for loans and in some cases can refer application to an institute from which the desired loan can be obtained.

A favorable loss experience has been reported, although the period of operation to date is too short to provide significant data.

Although the idea originated in the Northeast, an area in which development of new resources is limited and in which some industries have reached or passed their peak, interest has spread into the South, Middle West and Far West, showing that the basic problem is a national one.

The favorable New England record of these credit corporations may greatly influence formation of similar organizations in other sections. It fosters the hope, as Guaranty expresses it, "that a useful means has been found for adapting the credit facilities of a private-enterprise economy to the changing needs of that economy."

Such groups might well prove of considerable benefit to those producing farm chemicals. Rapidly changing technology, especially in the fertilizer industry, has brought many new developments. The smaller members of the industry could be placed in a much more favorable financial position for adapting their facilities to these changes through the assistance of a credit corporation.

G. P. T., JR.  
Editor

FARM CHEMICALS

# Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

## ALDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

## AMMONIA—Anhydrous and Liqueur

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Commercial Solvents Corporation, New York City  
Escambia Bay Chem. Corp., Pensacola, Fla.  
Grand River Chem. Div., Deere & Co., Tulsa, Okla.  
Lion Oil Co., El Dorado, Ark.  
Mississippi River Chem. Co., St. Louis, Mo.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Phillips Chemical Co., Bartlesville, Okla.  
U. S. Industrial Chemicals, New York City

## AMMONIA APPLICATORS

KBH Corp., Clarkdale, Miss.

## AMMONIA CONVERTER

J. C. Carlile, Corp., Denver, Colo.

## AMMONIUM NITRATE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Commercial Solvents Corporation, New York City  
Escambia Bay Chem. Corp., Pensacola, Fla.  
Lion Oil Co., El Dorado, Ark.  
Mississippi River Chem. Co., St. Louis, Mo.  
Phillips Chemical Co., Bartlesville, Okla.

## AMMONIUM PHOSPHATE

Monsanto Chem. Co., St. Louis, Mo.

## AMMONIUM SULFATE

See Sulfate of Ammonia

## BAGS—BURLAP

Chase Bag Co., Chicago, Ill.

## BAGS—COTTON

Chase Bag Co., Chicago, Ill.

## BAGS—Multiwall-Paper

Chase Bag Co., Chicago, Ill.  
International Paper Co., Bagpak Div., N. Y. C.  
Hammond Bag & Paper Co., Wellsburg, W. Va.  
Kraft Bag Corporation, New York City  
Union Bag & Paper Corp., New York City

## BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.  
McIver & Son, Alex. M., Charleston, S. C.

## BAG CLOSING MACHINES

International Paper Co., Bagpak Div., N. Y. C.

## BAG PRINTING MACHINES

Schmutz Mfg., Louisville, Ky.

## BAG FILLING MACHINES

E. D. Coddington Mfg. Co., Milwaukee, Wisc.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Union Bag & Paper Corp., New York City

## BHC AND LINDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.

## BIN LEVEL CONTROLS

Stephens-Adamson Mfg. Co., Aurora, Ill.

## BIN DISCHARGERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

## BONE PRODUCTS

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## BORAX AND BORIC ACID

American Potash & Chemical Corp., Los Angeles, California  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## BOX CAR LOADERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

## BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Keim, Samuel D., Philadelphia, Pa.  
McIver & Son, Alex. M., Charleston, S. C.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## BULK TRANSPORTS

Highway Equipment Co., Cedar Rapids, Ia.

## CALCIUM ARSENATE

American Agricultural Chemical Co., N. Y. C.

## CAR PULLERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

## CARS AND CART

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## CASTOR POMACE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
McIver & Son, Alex. M., Charleston, S. C.

## CHEMISTS AND ASSAYERS

Shuey & Co., Inc., Savannah, Ga.

## CHLORDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.

## CLAY

Ashcraft-Wilkinson Co., Atlanta, Ga.

## CONDITIONERS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Jackle, Frank R., New York City  
Keim, Samuel D., Philadelphia, Pa.  
McIver & Son, Alex. M., Charleston, S. C.  
National Lime & Stone Co., Findlay, Ohio

## CONVEYORS

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Stephens-Adamson Mfg. Co., Aurora, Ill.  
Sturtevant Mill Co., Boston, Mass.

## COPPER SULFATE

Tennessee Corp., Atlanta, Ga.

## COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## CUSTOM PESTICIDE FORMULATION

Barco Chemicals, Inc., Des Moines, Ia.

## DDT

Ashcraft-Wilkinson Co., Atlanta, Ga.

## DIELDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

## DILUENTS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.  
Summit Mining Corp., Carlisle, Pa.  
Thomas Alabama Kaolin Co., Baltimore, Md.

## DITHIOCARBAMATES

Berkshire Chemicals, New York City

## DUST APPLICATORS

Raw Materials Trading Co., New York City

## ELEVATORS

Power-Curve Conveyor Co., Denver, Colo.  
Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Stephens-Adamson Mfg. Co., Aurora, Ill.

## ENDRIN

Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

## ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## FERTILIZER—Liquid

Clover Chemical Co., Pittsburgh, Pa.

## FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.

## FILLERS

Bradley & Baker, N. Y. C.

## FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

## FUNGICIDES

American Agricultural Chemical Co., N. Y. C.  
Berkshire Chemicals, New York City  
Metalsalts Corp., Hawthorne, N. J.  
Tennessee Corp., Atlanta, Ga.

## HERBICIDES

American Potash & Chemical Corp., Los Angeles, California  
Barco Chemicals, Inc., Des Moines, Ia.  
Lion Oil Company, El Dorado, Ark.

## HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

## HOPPERS & SPOUTS

Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Berkshire Chemicals, New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## INSECTICIDES

American Agricultural Chemical Co., N. Y. C.  
American Potash & Chemical Corp., Los Angeles, California  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Barco Chemicals, Inc., Des Moines, Ia.  
Berkshire Chemicals, New York City  
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City  
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.  
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

## IRON SULFATE

Tennessee Corp., Atlanta, Ga.

## KAOLIN

Thomas Alabama Kaolin Co., Baltimore, Md.

## LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

## LIMESTONE

American Agricultural Chemical Co., N. Y. C.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
National Lime & Stone Co., Findlay, Ohio

## MACHINERY—Acid Making and Handling

Chemical Construction Corp., New York City  
Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Acidulating

Chemical Construction Corp., New York City  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY—Grinding and Pulverizing

Bradley Pulverizer Co., Allentown, Pa.  
Poulsen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.  
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

# Buyers' Guide

## MACHINERY—Material Handling

Clark Equip. Co., Construction Mach. Div., Beaton Harbor, Mich.  
Hough, The Frank G. Co., Libertyville, Ill.  
Jaeger Machine Co., Columbus, O.  
Link-Belt Co., Chicago, Ill.  
Poulsen Co., Los Angeles, Calif.  
Power-Curve Conveyor Co., Denver, Colo.  
Sauerman Bros. Inc., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Stephens-Adams Mfg. Co., Aurora, Ill.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Mixing and Blending

Munson Mill Mach. Co., Utica, N. Y.  
Pousen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Mixing, Screening and Bagging

Poulsen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Power Transmission

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY

### Superphosphate Manufacturing

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MAGNESIUM SULFATE

Berkshire Chemicals, New York City

## MANGANESE SULFATE

Tennessee Corp., Atlanta, Ga.

## MANURE SALTS

Potash Co. of America, Washington, D. C.

## MINOR ELEMENTS

Tennessee Corporation, Atlanta, Ga.

## MIXERS

Munson Mill Mach. Co., Utica, N. Y.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## NITRATE OF POTASH

Berkshire Chemicals, New York City

## NITRATE OF SODA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
McIver & Son, Alex. M., Charleston, S. C.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
International Min. & Chem. Corp., Chicago, Ill.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NITROGEN SOLUTIONS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Commercial Solvents Corporation, New York City  
Escambia Bay Chem. Corp., Pensacola, Fla.  
Mississippi River Chem. Co., St. Louis, Mo.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Lion Oil Company, El Dorado, Ark.  
Phillips Chemical Co., Bartlesville, Okla.

## NITROGEN MATERIALS—Organic

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
Smith Rowland Co., Norfolk, Va.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## ORGANIC MERCURY COMPOUNDS

Metalsalts Corp., Hawthorne, N. J.

## PARATHION

Ashcraft-Wilkinson Co., Atlanta, Ga.

## PHOSPHATE ROCK

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
McIver & Son, Alex. M., Charleston, S. C.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## PHOSPHORIC ACID

American Agricultural Chemical Co., N. Y. C.

## PLANT CONSTRUCTION—Fertilizer and Acid

Atlanta Utility Works, The, East Point, Ga.  
Chemical Construction Corp., New York City  
Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## POTASH—Muriate

American Potash & Chemical Corp., Los Angeles, California  
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Duval Sulphur & Potash Co., Houston, Tex.  
International Min. & Chem. Corp., Chicago, Ill.  
McIver & Son, Alex. M., Charleston, S. C.  
Potash Co. of America, Washington, D. C.  
Southwest Potash Corporation, New York City  
United States Potash Co., N. Y. C.

## POTASH—Sulfate

American Potash & Chemical Corp., Los Angeles, California  
International Min. & Chem. Corp., Chicago, Ill.  
Potash Co. of America, Washington, D. C.

## PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

## PYROPHYLLITE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

## REPAIR PARTS AND CASTINGS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCALES—Including Automatic Baggers

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCRAPER MACHINES

Sauerman Bros., Inc., Chicago, Ill.

## SCREENS

Atlanta Utility Works, The, East Point, Ga.  
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.  
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

## SEPARATORS, AIR

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

## SHOVEL LOADERS

Clark Equip. Co., Benton Harbor, Mich.  
Hough, The Frank G. Co., Libertyville, Ill.  
Jaeger Machine Co., Columbus, O.

## SOLVENTS

Crowley Tar Products Co., New York City  
Richfield Oil Corp., Los Angeles, Calif.

## SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## SPREADERS, TRUCK

Highway Equipment Co., Cedar Rapids, Ia.

## STORAGE BUILDINGS

Butler Manufacturing Co., Kansas City, Mo.

## STORAGE TANKS

Broadway Rubber Corp., Louisville, Ky.  
Butler Manufacturing Co., Kansas City, Mo.  
Cole, R. D., Manufacturing Co., Newnan, Ga.

## SULFATE OF AMMONIA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.

Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Lion Oil Co., El Dorado, Ark.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Phillips Chemical Co., Bartlesville, Okla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFATE OF POTASH—MAGNESIA

International Min. & Chem. Corp., Chicago, Ill.

## SULFUR

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Texas Gulf Sulphur Co., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFUR—Dusting & Spraying

Ashcraft-Wilkinson Co., Atlanta, Ga.  
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

## SULFURIC ACID

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Lion Oil Company, El Dorado, Ark.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

## SUPERPHOSPHATE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TALC

Ashcraft-Wilkinson Co., Atlanta, Ga.

## TANKAGE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
Smith Rowland Co., Norfolk, Va.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TANKS—NH<sub>3</sub> and Liquid N

Broadway Rubber Corp., Louisville, Ky.  
Butler Manufacturing Co., Kansas City, Mo.  
Cole, R. D., Manufacturing Co., Newnan, Ga.  
KBH Corporation, Clarksdale, Miss.

## TOXAPHENE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

## TRUCKS—SPREADER

Highway Equipment Co., Cedar Rapids, Ia.

## UREA & UREA PRODUCTS

Bradley & Baker, N. Y. C.  
Grand River Chem. Div., Deere & Co., Tulsa, Okla.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.

## VALVES

Monarch Mfg. Works, Inc., Philadelphia, Pa.

## ZINC SULFATE

Tennessee Corp., Atlanta, Ga.

## FARM CHEMICALS



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3 Generations  
of Bag Making  
Experience



| FEATURES  | KRAFT BAG CORPORATION | OTHER SOURCES ? |
|---|-----------------------|-----------------|
| Forest Lands  | ✓                     |                 |
| Pulp Mill   | ✓                     |                 |
| Bleach Plant  | ✓                     |                 |
| Paper Mill  | ✓                     |                 |
| Multiple Bag Plants   | ✓                     |                 |
| Natural Kraft   | ✓                     |                 |
| Colored Kraft   | ✓                     |                 |
| Bleached Kraft  | ✓                     |                 |
| Creped Kraft  | ✓                     |                 |
| Wax Laminated Kraft   | ✓                     |                 |
| Asphalt Laminated Kraft                                       | ✓                     |                 |
| Wet-Strength Kraft  | ✓                     |                 |
| Water Repellent Kraft   | ✓                     |                 |
| Stak-LOK Super Rough Kraft                                    | ✓                     |                 |
| Valve Bags—sewn or pasted                                     | ✓                     |                 |
| Open Mouth Bags—sewn or pasted                                | ✓                     |                 |
| Flat Sewn Valve Bags  | ✓                     |                 |
| Flat Sewn Open Mouth Bags                                     | ✓                     |                 |
| KRAFT-lok Valve Closure                                       | ✓                     |                 |
| Creped Tape   | ✓                     |                 |
| Gummed Tape   | ✓                     |                 |
| Filter Cord   | ✓                     |                 |
| Sewing Thread—(the only material we do not produce ourselves) |                       |                 |
| 1-2-3-4 Color Printing  | ✓                     |                 |
| Art Department  | ✓                     |                 |
| Bag Development and Research                                  | ✓                     |                 |

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